Child Labor in the Sugarcane Industry in Paraguay

Task Order I and Task Order III: quantitative research and data collection

August 2012

Submitted to:
United States Department of Labor
Office of Child Labor, Forced Labor, and Human Trafficking
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I. EXECUTIVE SUMMARY

ICF Macro carried out a survey of sugarcane-producing areas in Paraguay for the U.S. Department of Labor (USDOL) between July and August, 2011. The main population of interest consisted of children from 5 to 17 years of age who were involved in the cultivation or harvesting of sugarcane for human consumption. The primary objective of the study was to estimate the prevalence of children working in the sugarcane industry in Paraguay and to obtain representative information on the working conditions of these children, with a focus on workplace hazards.

To collect these data, ICF Macro conducted a quantitative household survey in the main sugarcane-producing departments of Paraguay, including Guairá, Caaguazú, Paraguarí, Caazapá, and Cordillera. The survey collected information from households involved in sugarcane-related activities (sugarcane households), as well as households whose main economic activity was agriculture but were not involved in sugarcane-related activities (reference households). The household survey included both interviews with adult informants about the household and its members, as well as interviews with all the children 5–17 years of age living in the household. A total of 596 sugarcane households, 406 reference households, and 1,135 children were interviewed. The data obtained from the household survey were complemented with worksite observations in 47 sugarcane farms where children were found to be working.

Based on adult reports, the study found that children represented 28.0 percent of the total workforce involved in sugarcane-related activities in the last 12 months in Paraguay, or an estimated population of 54,928 children, out of a total sugarcane workforce of 195,893 workers. The population of currently active sugarcane workers (those who worked in the last 7 days), would be lower, at 130,557, out of which 36,729 or 28.1 percent are children. Adult household informants may, however, underestimate the number of children involved in sugarcane work. If children reports are used, the number of children working in sugarcane-related activities for at least 1 hour in the last 12 months would be 63,698, and the number working in the last 7 days would be 45,123.

Children who are currently working in sugarcane-related activities (hereafter referred to as sugarcane children) are predominantly male (81.8 percent), and have a median age of 14, with more than half of sugarcane children (53.6 percent) in the 14 to 17 years age group. The majority of these children live with both parents (82.9 percent). Sugarcane children live in larger households than do other working children or non-working children in the surveyed population, under a head of household who is typically married and has attained the second cycle of primary education. The households of sugarcane children appear to be less wealthy than the households of other children in the surveyed population, and the attitudes of the heads of household of sugarcane children seem more favorable to child work at an earlier age than those of other children's heads of households.

School participation is similar for sugarcane children and other children, but fewer sugarcane children are currently attending school, even after controlling for age. Reasons given by household informants for this non-attendance include first, lack of interest in school; second, impossibility to afford schooling; and only in third place, to work. Among those sugarcane children who are attending school, school absenteeism does not appear to be higher than it is for other working or non-working children, but sugarcane children show slower progress in school and a greater

age-grade delay. Overall, 14.3 percent of sugarcane children who are attending school reported that work interferes with their studies and as many as 13.2 percent report missing school for work once per week or more often.

Sugarcane children spend a significant amount of time in both economic (work) and non-economic (household chores) activities. Most children working in the sugarcane industry perform household chores in a given week, mainly cleaning the house, collecting firewood, shopping, cooking, serving meals, and washing dishes. Sugarcane children spend more than 17 hours per week on household chores. While sugarcane children spend as much time as non-working children on household chores, they have a greater involvement on heavy-duty chores, such as collecting firewood or water. Sugarcane girls, in particular, bear the greatest load; they spend nearly twice as many hours doing chores than do sugarcane boys (28 hours vs. 14 hours).

Currently active sugarcane children are primarily involved in activities directly related to the harvesting process, including peeling sugarcane leaves (79.4 percent), cutting down sugarcane (67.2 percent), and manually loading the sugarcane cart (56.4 percent). Although fewer girls participate in sugarcane-related activities, those who do participate carry out much the same tasks as boys, except for cutting down sugarcane, which is a physically demanding activity, where the participation of sugarcane girls is lower (44.7 percent vs. 72.3 percent in the case of sugarcane boys).

Sugarcane children work on average 8.4 months per year in sugarcane-related activities, and 3.3 weeks during a typical month. The peak harvest months are when most sugarcane children report to be working, including June, with 82.2 percent of sugarcane children working, followed by July (73.7 percent). Besides harvesting, a smaller proportion of sugarcane children work in other sugarcane-related activities throughout the year. Sugarcane children typically work an average of 26 hours per week, nearly 5 hours more than children working in other sectors. When the last week is used as a reference period, children working in sugarcane-related activities reported to work on average 22 hours and 25 minutes per week, also nearly 5 hours more than children working in other sectors.

Sugarcane children work primarily for their parents (72.1 percent) on family-owned farms (59.5 percent), or with their parents but for other owners (15.1 percent) on third-party farms (34.8 percent). Only 12.5 percent of sugarcane children are not working for or with a parent. A majority of sugarcane children get paid weekly (56.4 percent) and in cash (66.8 percent), receiving a weekly median of approximately 50,000 Guaraníes (approximately 13 USD). Approximately one in five children report that someone else (typically one of their parents) is paid for the work that they do.

Sugarcane children are in general not spontaneously aware of the risks they face at work. Only 32.5 percent considered their work dangerous. Children were asked about their work hazards by using spontaneous and prompted questions to compensate for this lack of awareness. Although the percentage of children reporting each hazard varies depending on the methodology used, the top hazards reported are consistent: extreme heat, snakes, insects, extreme cold, and prolonged exposure to the sun. Some hazards seem to occur more frequently in the sugarcane industry than in other sectors, most notably cuts, extreme heat, snakes, insects, extreme cold, prolonged exposure to the sun, carrying heavy loads, and children having something fall on them. Other hazardous working conditions include working for long hours (51.9 percent of sugarcane children reported

doing so in a typical week) or using dangerous tools (97.5 percent) such as machetes or knives. Up to 13.1 percent of sugarcane children also reported suffering from some type of physical, psychological, or sexual abuse at work. When taking all potentially hazardous processes and agents into account, it is estimated that 100 percent of sugarcane children are exposed to some hazardous working conditions.

Sugarcane children report suffering from injuries as a result of their work. About one in four sugarcane children (25.6 percent) report having been injured at work. Sugarcane children who were injured at work report an average of about two work-related injuries in the last 12 months. Most injuries include cuts or lacerations to the upper and lower extremities while peeling or cutting down sugarcane.

The results of this study clearly indicate that sugarcane work represents a hazardous occupation for children, with implications for their education and health. Sugarcane work done by children, therefore qualifies as a worst forms of child labor (WFCL).[1]

[1] See Section III.c for legal framework.

II. INTRODUCTION

The agriculture sector is the main employer of children in the world, accounting for 60 percent of an estimated 215 million child laborers (International Labour Organization, 2010). Many of these children work for long hours and are often exposed to toxic pesticides, dangerous tools, and extreme weather conditions. The International Labour Organization (ILO) considers agriculture to be among the three most dangerous sectors for children, along with construction and mining (ILO-IPEC, 2006). Besides the health risks, long days and heavy work often leave children with no time or energy to focus on their education. With no education and low skills, children working in agriculture are often trapped in the rural poverty cycle when they become adults.

Children in Paraguay are not foreign to the above problems. Approximately 15 percent of children 10–14 years of age in Paraguay work, out of which 60 percent are engaged in the agriculture sector (Céspedes, 2003). These children work mostly as family laborers and can be engaged in subsistence farming and/or in the production of cash crops. Sugarcane is one of the major cash crops produced in Paraguay, along with soy, cotton and corn. The cultivation of sugarcane in Paraguay has low levels of mechanization and employs a large number of families, including children. The sugarcane harvest involves exhausting work and using dangerous tools such as machetes. It often requires exposure to extreme weather conditions and other hazardous agents, such as poisonous snakes or pesticides.

Paraguay approved, in its 2005 Presidential Decree 4951, a list of 26 occupational categories that are considered hazardous for children and thus constitute cases of worst form of child labor (WFCL) accordingly to ILO Convention No. 182.[2] Among these hazardous forms, the decree mentions the following types of work (par. 11, 12, and 20):

- *Work that exposes individuals to extreme cold and hot temperatures ;*
- *Work that require the use of machinery and tools, manual and mechanical of an incisive-sharp (cutting), crushing, gripping and grinding nature;*
- *Work that implies manual transport of heavy loads, including its raising and placement.*

Work in the sugarcane sector involves all the above. Although this type of work clearly represents a potential threat to the safety of children, little is known on the prevalence of child work or the working conditions of children cultivating sugarcane in Paraguay.

a. Aim of the Study

This study aims to estimate the prevalence of children working in the sugarcane industry in Paraguay and to obtain representative information on the working conditions of these children, with a focus on workplace hazards. A secondary goal is to develop a broader understanding of the causes of child labor by analyzing household-level variables that may explain children's involvement in the sugarcane industry.

[2] See Section IV for relevant legal instruments and definitions.

The general objectives of the research study are as follows:

1. To raise awareness about the issues related to child labor in the sugarcane industry in Paraguay;
2. To contribute to the international discourse on exploitive child labor;
3. To inform the current and future child labor technical assistance efforts of the U.S. Department of Labor Office of Child Labor, Forced Labor, and Human Trafficking (USDOL/OCFT).

The specific objectives of this research are to estimate:

1. Prevalence of child labor;
2. Demographics of household/demographics of individual;
3. Relationship between child work and education;
4. Conditions of work, particularly in regard to hazardous work;
5. Prevalence of hazard exposures and outcomes of such exposure; and
6. Prevalence and nature of forced child labor and/or child trafficking.

b. Research Team

ICF Macro: This study is executed by ICF Macro under its "Research Services in Support of USDOL's Office of Child Labor, Forced Labor and Human Trafficking" contract with USDOL. ICF Macro administered all contracts, monitored and secured the flow of all necessary funds, and obtained all necessary permissions and authorizations including human subjects' approval. ICF Macro also supported the principal researcher with methodological design, questionnaire development, tabulation of data, and professional editing of the report. ICF Macro has final reporting responsibilities to USDOL.

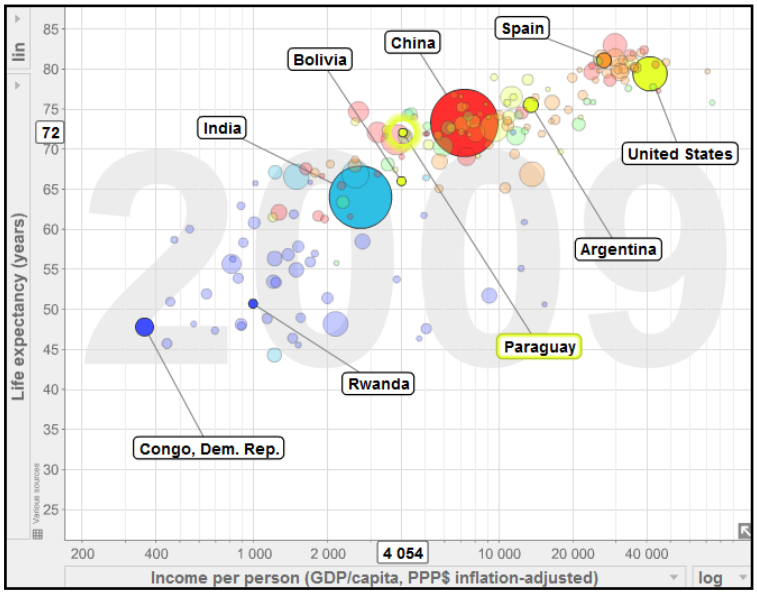
Principal Researcher (PR): ICF Macro contracted Mr. Pablo Diego Rosell, an international researcher, to serve as the principal researcher for this project. The PR was responsible for designing the research methodology, preparing the sampling frames and final sampling plan, and designing data collection instruments in collaboration with USDOL and ICF Macro. The PR identified, arranged and supervised the local subcontractor, developed and delivered training to the subcontractors' field team, and supervised questionnaire piloting. The PR also provided technical assistance to the subcontractor with the preparation of Geographic Information System (GIS)-referenced satellite maps of the sampled areas. Once data collection was complete, the PR performed quality control of all datasets, as well as data weighting and technical data analysis. The PR also developed the report outline and tabulation plan and drafted the final research report in collaboration with ICF Macro and USDOL.

First Análisis y Estudios (FAyE): ICF Macro subcontracted data collection to FAyE, a Paraguayan research firm based in Asunción. During the project design phase, FAyE helped the PR identify and collect data sources for the preparation of the sampling frames. FAyE then recruited the field team, including field supervisors and enumerators, and organized the training sessions. FAyE also arranged fieldwork and was responsible for the completion and quality control of all survey data. Finally, FAyE edited, coded, entered, processed, and cleaned all survey data and delivered the final datasets to ICF Macro.

III. BACKGROUND INFORMATION/LITERATURE REVIEW

Paraguay is a landlocked country situated in the center of South America and bordering Brazil, Argentina, and Bolivia. Based on projections from the 2002 census (Dirección General de Estadísticas, Encuestas y Censos, [DGEEC], 2011), the population, as of 2011, is 6.6 million, out of which almost 2 million reside in the capital and surrounding urban area known as Gran Asunción. The country has a relatively young demographic composition, with 44 percent of the population below 18 years of age (DGEEC, 2002a), and a median age of 25 years (CIA, 2011). Paraguay remains a relatively rural country compared with other countries in the region, with 39 percent of the population living in rural areas (DGEEC, 2002). As of 2004, it is estimated that approximately 900,000 children between 5 and 17 years of age were living in rural areas in Paraguay (DGEEC, 2004).

Figure III-1. Population Size, GDP per Capita, and Life Expectancy



Source: Gapminder–Google.

With a gross domestic product (GDP) per capita of USD 4,054 (adjusted at purchasing power parity), Paraguay can be considered a middle-income country (Figure III-1). However, the poverty rate is relatively high, particularly in rural areas. In 2003, up to 20 percent of the total population survived on less than 1 USD a day, and almost half of all Paraguayans lived on less than 2 USD a day (Garcitúa Marió, Silva-Leander & Carter, 2004). Furthermore, the 2002 national census reported that 25 percent of households were run by single parents (World Bank, 2006). Paraguay's young demography and high poverty rates are factors that contribute to child labor in Paraguay. According to USDOL, an estimated 15 percent of children between 10 and 14 years of age were working in Paraguay as of 2005 (USDOL, 2009, p. 526). This rate, extrapolated to 2011 population projections for this age group, represents a total of over 100,000 children.

Paraguay has a market economy characterized by a large informal sector. Agriculture dominates the Paraguayan economy, contributing to 20 percent of Paraguay's annual GDP as of 2009, and constitutes virtually all of the country's source of export (CIA, 2011). The agricultural sector is also the country's largest and most consistent source of employment—employing about 45 percent of the working population. Major agricultural products include cotton, sugarcane, soybeans, corn, wheat, tobacco, cassava (tapioca), fruits, vegetables; beef, pork, eggs, milk, and timber. Among these products, sugarcane is one of Paraguay's major cash crops for export and is increasingly being used

for the production of biofuel.[3] It was estimated that 60 percent of Paraguay's working children between 10 and 14 years of age are engaged in agriculture (USDOL, 2009), which represent an estimated total of approximately 64,000 children (DGEEC, 2011). Nevertheless, specific statistics regarding child labor in the sugarcane industry remain limited and deserve further research.

a. Industry Background

ICF Macro conducted exploratory research in Paraguay to develop methodologies for quantitative child labor surveys in December 2010 (ICF Macro, 2011). The sugarcane industry background presented here was collected during this exploratory exercise. This background information includes a desk review of existing information, as well as original information collected from key informants and during direct observations. Original information was collected mostly in the Department of Guairá, the country's main sugarcane-producing area.

Paraguay comprises 17 *departamentos* (departments), including the *departamento* Central, whose capital is the city of Asunción. Sugarcane is produced in 16 out of the 17 *departamentos*, but the production in 3 of them (Caaguazú, Guairá, and Paraguarí) accounts for 75.7 percent of the national production of sugar and for 59.4 percent of all the sugarcane-producing farms. The production in five departments (the three above plus Caazapá and Cordillera) accounts for 92.7 percent of the national sugarcane production and 76.0 percent of all the sugarcane-producing farms (DGEEC, 2008). The total area used for growing sugarcane in the country totals 81,855 hectares, and the total production of sugar in the country consists of 5,084,028 metric tons. The average sugarcane yield per hectare is 62.1 metric tons (more if the land is fertilized),[4] and a metric ton of cane is equivalent to 100 kilograms of sugar.

Paraguay produces two kinds of sugar: organic and conventional. Most of the organic sugar produced goes to the U.S. market and is "certified in origin" by specialized firms. In 2008, Paraguay produced 174,000 tons of sugar, of which 116,000 tons were organic and mainly for export; that is, 61.2 percent of the annual production (United States Agency for International Development, 2009).

According to the 2008 Agriculture Census, there are 20,550 producing units in Paraguay (farms used for the cultivation of sugarcane for human consumption, hereafter "sugarcane farms"), of which 87 percent have less than 20 hectares (small units), 9 percent between 20 and 50 hectares (medium units), and 4 percent more than 50 hectares (big units). An additional 32,498 farms produce sugarcane for fodder. Industry informants report that some of these farms also produce small amounts of sugarcane for human consumption. Eight main mill industries (*ingenios*) in the country produce sugar, alcohol, and other derivatives from sugarcane (Azucarera Paraguaya S.A., Azucarera Friedmann S.A., Azucarera Guarambaré S.A., La Felsina S.A., OTISA, INSAMA, Censi & Pirotta, and Azucarera Iturbe S.A.), as well as a public company (PETROPAR) that produces alcohol and biofuel from sugarcane. Most of them produce both conventional and organic sugar. According to the *Programa Nacional de Caña de Azúcar* (National Sugarcane Program) of the Ministry of Agriculture, the sugarcane industry engages approximately 31,250 people (adults) directly and 220,000 indirectly.

[3] See for example http://news.mongabay.com/bioenergy/2007/03/paraguay-launches-plan-to-become-major.html
[4] Productivity varies significantly depending on the size of land and mechanization.

An export boom is currently affecting the offer and price of sugar, even in the local market. Sugarcane workers are not, however, benefiting from this boom. Low incomes and poor living conditions in the rural milieu have resulted in a sustained emigration trend from the rural zones to urban areas in Paraguay and abroad (Argentina, Brazil, and Spain). Currently, there is a shortage of specialized labor in the sugar fields.

The following observations apply to the Department of Guairá, the most important sugarcane-producing zone in the country, which represents 38.55 percent of the national production, and where the exploratory research was carried out. Guairá is organized into 18 districts, 14 of which are involved in sugarcane production. Although only one department was explored, the main differences in the methods of sugarcane production would be between mechanized and manual production, and between organic and non-organic production; all types are found in Guairá. The literature does not explicitly mention whether production methods are homogenous in other departments, but there is no evidence to the contrary.[5] According to information from the General Directorate of Statistics, Surveys, and Census (DGEEC), Guairá has a total population of 178,650 people, of whom 55,200 live in the regional capital city of Villarrica, located 190 kilometers to the southeast of the national capital, Asunción. Sixty-five percent of the population lives in the rural milieu. More than 50 percent of the economically active population of Guairá works in tasks related to the agriculture sector.

Four major companies (mills) buy and process sugar in the Guairá region: Azucarera Paraguaya S.A. (AZPA), Azucarera Friedmann S.A. (AFSA), PETROPAR, and Azucarera Itrube S.A. Some of the mills produce both organic and conventional sugar (AZPA, Iturbe), while some only produce the latter (AFSA), and others only produce alcohol and biofuel (PETROPAR). Among those mills, one company, AZPA, accounts for 47 percent of the sugarcane processed in the region. The technological level of the companies is varied; some companies still use 100-year-old steam-based machinery, and other companies have recently been modernized.

The sugarcane supply chain in Paraguay is composed of different sorts of agents, starting with landowners, who may be small (individuals or poor families owning less than 20 hectares), medium-sized (between 20 and 50 hectares), or big (more than 50 hectares). Cane producers may exploit their plots individually or through committees (a group of less than 20 small owners of land) or associations (more than 20 members). Rural owners of less than 20 hectares of land (usually owning between 1/2 and 5 hectares) work frequently as laborers, together with their families (including their children) in their own plots and their neighbors' plots. Likewise, the small producers also work with their families on bigger plots belonging to wealthier individual owners (whom they call *patrones*). This way to organize production is common to the sugarcane sector in the entire country. Sugarcane is sown every 5 years and harvested every year. Pesticides are rarely used for sugarcane (none for organic cane). Harvest time runs from March to December and is more intensive between May and September (peaking between June and August).

Most sugarcane-related work is paid by piecework/piece rate (for example, 30,000–35,000 Guaraníes on average per metric ton of cane cut and delivered by a worker to a truck). Sugarcane-related work occurs all year, but both adults and children work more intensively during the harvest

[5] See for example http://paraguay.usaid.gov/economic/publicaciones/azucar.pdf or http://www.natlaw.com/interam/pr/ag/sp/spprag00004.pdf

period. Thus, most rural families use child labor as a way to increase their output and earnings, and to deliver their produce faster. Likewise, together with the helping hands of their families and children, rural laborers cultivate other products in their own land for their families' consumption, such as beans, manioc, corn, small cattle, chickens, and other animals. There is also some small production of honey from sugarcane at the domestic level.

Small- and medium-sized producers use their labor as well as that of their neighbors to harvest bigger plots, particularly those belonging to the sugarcane companies. The fact that the formal sugarcane industry is highly mechanized and better monitored may explain why it appears to employ only adult workers in its direct operations (e.g., for sowing, taking care of, and harvesting cane in the company-owned land, and for processing sugarcane as sugar, alcohol, and other derivatives at their mills). Direct operations of the formal sugarcane industry are subject to control by both labor authorities and foreign auditing firms, in order to comply with the international standards that allow them to access certification, effectively leaving child labor in sugarcane-related activities out of the enterprises' operations.

However, only 30 percent of the sugarcane processed by the mills (these data are valid at the country level) comes from land controlled/worked directly by them. This means that while the activities of the formal sector (mills and land worked by formal companies/industries) may be free of child labor, the source of the supply chain leading to the mills involves child labor through family work by the piece, even if those who "officially" receive pay are adults. That is, 70 percent of the raw material processed by the mills (at the country level) to produce both conventional and organic sugar, alcohol, and derivates is bought from independent small, medium, and big landowners, or from the intermediaries who may eventually buy the production of the above landowners and later resell it to the mills. These middlemen consist mainly of truck owners, who have enough capital to buy the sugarcane and transport it to the mills.

Likewise, given that all mills have organized the reception of raw material from producers through a system of weekly "turns" allocated to specific individuals and/or producers, this fact has become an important feature that gives truck owners an important brokerage power on the peasants. For example, small producers often have no "turn" of their own available to introduce their product to the mills, so they use the truck owners' "turn" to transport and sell their product to the mills; however, if this does not happen, the producers would lose their product. This allows the truck owners, who often own land, to establish transport rates that give them important profits but have a negative impact on small landowners' earnings. In other cases, transport owners buy the product of small producers in advance, and impose the price at which the latter have to sell this product. In such cases, buyers usually recruit and bring their own labor to harvest and collect the sugarcane and load it onto their trucks. As a result of the market dynamics described above, the margins of small producers are small, and their profit per metric ton is very similar to what they pay for labor: approximately 35,000 Guaraníes per metric ton, even if they have invested 1 year of their time and their capital in the harvest.

b. Previous Research

In Paraguay, the legal minimum age for employment is 14 years.[6] However, based on the child labor module of the National Household Survey of Paraguay, half of the population of children between 5 and 17 years of age worked at least 1 hour per day. Further, it is estimated that 60 percent of children in rural areas work (Céspedes, 2006). A public opinion poll by the *Comisión Nacional de Erradicación del Trabajo Infantil* (CONAETI) and ILO in 2002 indicate that most Paraguayans condemn the use of children for begging or working in the streets, drug trafficking, and commercial sexual exploitation. However, child involvement in domestic labor and agriculture appears to be more acceptable (Carosini, 2004).

There is, in any case, little original research on this topic. Most research on child labor in Paraguay has focused on child soldiers, domestic labor, and commercial sexual exploitation (ICF Macro, 2009). The only specific publication on child labor in the rural sector in Paraguay is a 2005 study carried out in the Department of Canindeyú by the nongovernmental organization (NGO) *Movimiento por la Paz, el Desarme y la Libertad*, with the support of the ILO: *Trabajo Infantil Rural en Canindeyú, Paraguay*. The study sampled 246 families enrolled in a food safety program run by the NGO. Out of the total 246 families, there were 388 boys and 417 girls working in agricultural activities. The study found that most children were working as unpaid family laborers to cultivate manioc, cotton, corn, peanuts, and other crops. Many children were exposed to pesticides and inflammable substances; they also worked long hours under high temperatures, far from health centers or sanitary facilities. Few child workers used adequate protective gear.

Although the conditions described in this study are likely similar to the prevailing conditions in other regions and crops, none of the children in the sample were involved in the cultivation of sugarcane, so it is difficult to generalize these findings to the sugarcane industry.

Based on ICF Macro's exploratory research (ICF Macro, 2011), children as young as 8 years old seem to participate regularly in sugarcane production activities in Paraguay. Typical activities done by children include most of those carried out by adults in the fields. Sugarcane cultivation activities happen throughout the year: plots are to be kept clean from weeds and brushed from time to time, and land has to be turned over with a hoe each year and fertilized. Harvest-related activities consist of cutting down the sugarcanes with machetes, peeling their leaves with a *machetillo* (small machete), cutting the remaining sticks into smaller pieces, assembling them into bundles, loading these bundles into a cart, transporting the load to a piling point, and later helping to weigh and load 1,000-kilogram-bundles into a truck using a crane composed of two big tree trunks united at the bottom edge. While one of the trunks of the crane is embedded into land, the other one is free to turn around with the aid of metal wire or rope, moving loads from the place they are picked up and loading them onto a truck. The loads are affixed to the end of a metal pulley, then are pulled and raised by oxen.

Child labor is used intensively in both preparation and harvest-related activities. According to the informants interviewed by ICF Macro, between 70 and 90 percent of child laborers in the area work in sugarcane production (ICF Macro, 2011). Children start working in sugarcane-related activities with their parents and relatives between 8 and 10 years of age. According to most

[6] See Section III.c for a more detailed review of the legal framework for CL in Paraguay.

informants, the majority of the children working in these activities are male. Children participate in the majority of the tasks mentioned above. When they are small (younger than age 14), children clean the land and peel the leaves off the sugarcane sticks. By the time they reach age 15, many children cut down cane, peel it, cut it into pieces, and help transport it to piling points. As they grow older, children's involvement in sugarcane-related work becomes the same as adults'.

There were some clear indications during the exploratory phase of the project that these activities are hazardous. Child workers in the sugarcane industry are submitted to significant health hazards and risks, including the use of dangerous tools such as machetes, working long hours in physically demanding tasks, risk of fatal accidents because of their proximity to machinery such as the artisanal cranes (i.e., winches) that lift loads onto trucks, exposure to sunburn and dehydration , permanent inhalation of dust and contact with other chemical substances such as fertilizers, exposure to cuts and bruises because of contact with brush and cane, and exposure to snake bites.

These findings from the exploratory research are limited in scope and qualitative in nature. Although child labor in the Paraguayan sugarcane industry is potentially widespread, no study to date has quantified the extent and prevalence of this type of child labor, or has determined whether it is carried out in hazardous conditions.

c. Legal Framework

Since the end of the Stroessner dictatorship (1954–1989) Paraguay has gradually enacted a body of laws and regulations governing the rights of children, beginning with the ratification of the United Nations (UN) Convention on the Rights of the Child (1990) and approval of the new Constitution (1992). In Paraguay, children under age 12 are not allowed to work. Those between 12 and 14 years of age may engage in light work with parental supervision in nonhazardous and non-industrial working conditions (Articles 36, 120, 123, Gobierno de Paraguay, 1994)—although "light work" has not yet been defined in the Paraguayan Legal framework (ILO Committee of Experts, 2011). The minimum age for full-time employment is 14 years (15 years for industrial work), with the exception of children older than 12 years who work in authorized professional schools and family business where the work is not dangerous (Articles 119, Gobierno de Paraguay, 1994). The main national laws and international instruments relevant to children are noted below.

National Laws

National Constitution of Paraguay (1992, Article 54): Establishes the right of children to be protected from neglect, malnutrition, violence, abuse, trafficking, and exploitation. Article 90 specifies that child workers shall receive protection to guarantee a normal physical, intellectual, and moral development. Article 10 forbids slavery, serfdom, and trafficking in persons.

Labor Code (Law 213/93): Forbids work for children under age 15 in industrial occupations. Allows children between 14 and 18 years of age to work in non-industrial occupations, but only as long as several specific conditions are met, including the following:

- The child has completed primary education or work does not impede the child's school attendance.
- The child has a certificate of mental and physical fitness for work.

- The child works in tasks that are not dangerous or unhealthy.
- The child does not work during the night, from 10:00 pm to 6:00 am (excluding domestic work). For children between 13 and 15 years of age, work is forbidden between 8:00 pm and 8:00 am.
- The child has authorization to work from a parent/guardian.
- The child works a maximum of 4 hours per day or 24 hours per week if the child is not attending school, or a maximum of 2 hours per day if the child is attending school, but only if the total hours of work and schooling do not exceed 7. The child does not work on Sunday and holidays.

Labor Code Amendments (Law 496/94): Modifies several aspects of the Labor Code (Law 213/93), including—

- *Minimum age:* Children between 12 and 15 years of age are allowed to work in family-owned enterprises, as long as the work is not hazardous and they work a maximum of 4 hours per day or 24 hours per week. Establishes fines for employers of children under age 12.
- *Night work:* Children are forbidden to work from 8:00 pm to 6:00 am (excluding domestic work).

Child and Adolescent Code (Law 1680/01): Establishes 14 as the minimum age for work. Limits the maximum hours of work for children 14 and 15 years old to no more than 4 hours per day or 24 hours per week. Limits the maximum hours of work for children 16 and 17 years old to no more than 6 hours per day or 36 hours per week. Prohibits general types of work for children 14 to 17 years old, including work at night 8:00 pm to 6:00 am) and hazardous work.

Decree 4951/05: Establishes occupations prohibited for children under 18 years of age. This article is aligned with ILO convention 182 and prohibits work in 26 broad occupations, including operating dangerous machinery, working with toxic substances, carrying heavy loads, working at night, and working under extreme temperatures.

Some of the regulations presented above on legal work hours for children are conflicting. Specifically, the Child and Adolescent Code stipulates that children between 14 and 16 years of age may not work more than 4 hours per day and 24 hours per week, and children 16 to 18 years old may not work more than 6 hours per day and 36 hours per week. However, according to the Labor Code, children between 12 and 15 years of age may not work more than 4 hours per day, or 24 hours per week, while children 15 to 18 years old may not work more than 6 hours a day or 36 hours per week. The Child Code minimum age of 14 overrides the Labor Code minimum age of 12. Therefore Paraguayan children are not legally permitted to work if they are under age 14, except to perform light work. The Government, however, has not yet adopted regulations governing the nature and conditions of the light work permitted for children between 12 and 14 year of age.

International Instruments

Paraguay is a signatory to all fundamental human rights conventions relating to child labor, including:

- *ILO Convention 29—Forced Labor Convention* (ratified 1967).
- *ILO Convention 105—Abolition of Forced Labor Convention* (ratified 1968).
- *ILO Convention 138—Minimum Age Convention* (ratified 2004).
- *ILO Convention 182—Worst Forms of Child Labor Convention* (ratified 2001).
- *UN 2000 Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, Supplementing the United Nations Convention Against Transnational Organized Crime (Palermo Protocol)* (ratified 2000).

Figure III-2. Summary of the Legal Framework Relevant to Child Labor in Paraguay

	C138, Minimum Age	✓
	C182, Worst Forms of Child Labor	✓
	CRC	✓
	CRC Optional Protocol on Armed Conflict	✓
	CRC Optional Protocol on the Sale of Children, Child Prostitution, and Child Pornography	✓
	Palermo Protocol on Trafficking in Persons	✓
	Minimum Age for Work	14
	Minimum Age for Hazardous Work	18
	Compulsory Education Age	14
	Free Public Education	Yes

Source: *U.S. Department of Labor's 2010 Findings on the Worst Forms of Child Labor* (2010)

IV. KEY DEFINITIONS

Sugarcane

Sugarcane is used for two main purposes in Paraguay, identified and clearly separated in the 2008 Agriculture Census:

1. For fodder
2. For human consumption.

During this research, children were observed to be working in the production of sugarcane for fodder; so this is an area that deserves further study. This study is restricted to sugarcane cultivated for human consumption, whether it is processed in an industrial or an artisanal setting.

Sugarcane-Related Activities

In the context of this research, we classify sugarcane-related activities in two main categories, including the cultivation and harvest of sugarcane. Each of these two groups includes in turn several specific activities that are detailed in Table IV-1. Even though these were the main activities identified during our exploratory research, other activities related to the cultivation or harvest of sugarcane came up during fieldwork. Interviewers were instructed to note these additional activities and treat them as sugarcane-related activities in case of doubt. These additional activities were later examined on a case-by-case basis and were accepted or discarded as sugarcane-related activities for the purposes of our study.

Table IV-1. Measuring Sugarcane-Related Activities

Group	Activity
"Have you engaged in _____ for at least 1 hour in the past 12 months?"	
Cultivation	Cleaning/weeding/burning weeds from the land for sugarcane
	Sowing sugarcane
	Fertilizing sugarcane
	Fumigating sugarcane
Harvest	Burning the sugarcane fields before the harvest
	Cutting down sugarcane
	Peeling sugarcane leaves
	Manually loading cart with sugarcane
	Weighting and/or loading s sugarcane with a winch
	Driving a tractor for sugarcane work
	Transporting sugarcane to the factory with cart/truck
Other	Other sugarcane-related activities (specify)

The project made the explicit decision to exclude the following categories from the operational definition of sugarcane-related activities:

- Sugarcane-processing activities, including cleaning and crushing the sugarcane, as well as filtering, purifying, evaporating, crystallizing, and any other processing of the sugarcane juice. These activities go beyond the sugarcane cultivation process and typically occur in formal industrial settings where fewer or no children are found.
- Support activities, including transporting sugarcane workers, and preparing and delivering meals for these workers.

Household

A household is defined using the same criteria that in surveys from the Statistical Information and Monitoring Programme on Child Labour (SIMPOC), as "a person or group of persons who live together in the same house or compound, share the same housekeeping and cooking arrangements." Members of a household are not necessarily related by blood or marriage. For example, a domestic servant who sleeps in the same compound as the other household members and eats with them most days of the week would be considered a household member. There may also be single-person households or households where none of the members are related by blood or marriage. Finally, not all relatives in the same house or compound are necessarily part of the same household.

Sugarcane Household

A sugarcane household is, for the purpose of this study, any household where at least one person has been involved in sugarcane-related activities for at least 1 hour in the last 12 months.

Reference Household

A reference household is defined as a household whose main economic activity is agriculture. "Main" refers to the economic activity that occupies household members most time during the year. If two economic activities occupy approximately the same amount of time, the one that provides greater income is to be considered. The World Food Organization (FAO) defines "agriculture" as "the cultivation of crops and animal husbandry as well as forestry, fisheries, and the development of land and water resources."[7] In a reference household there must be no household members involved in sugarcane-related activities.

Worksite

Worksites observed for this research include sugarcane farms where children are carrying out sugarcane-related activities at the time of the observation. The focus on sugarcane farms responds to the project's definition of sugarcane-related activities, which are farm-based. However, while all sugarcane-related activities in our scope can be observed on sugarcane farms, transportation activities are mostly done on the tracks and roads between the farm and the sugarcane mills, and would only be observed when performed at or near the farms.

[7] This definition, based on the FAO definition of agriculture, is broader than the definition used by the U.S. Department of Agriculture, which excludes fishing and forestry. See for example http://www.fao.org/DOCREP/005/X2038E/x2038e0b.htm

Child

A child is "a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier," according to Article 1 of the UN Convention on the Rights of the Child,[8] to which Paraguay is a signatory. The 5 to 17 age range has been adopted by SIMPOC and many other child labor studies (ILO, 2004, p. 20). This range considers children under 5 years old too young to be interviewed and usually outside the child labor pool.

- **Operational Definition:** The term "child" is defined in this study as any person 5 to 17 years of age. This report also provides age breakdowns that reflect the provisions in the Paraguayan legal framework (e.g., children ages 5 to 11 are not allowed to work under any circumstance, those aged 12 to 13 are allowed to perform light work, and those aged 14 to 17 are allowed to work in non-hazardous occupations and occupations not classified as any other WFCL).

Work

For the purpose of this study, work is defined according to ILO, which defines work among children as those in an economically active population, with the exception of those who are currently unemployed and seeking work. According to ILO, the economically active population "comprises all persons of either sex who furnish the supply of labor for the production of economic goods and services as defined by the United Nations system of national accounts and balances during a specific time referenced period" (ILO, 2000).

This definition includes the following (ILO-IPEC, 2004):

- Paid employees (paid in cash or in kind)
- Self-employed persons
- Own-account workers
- Apprentices who receive payment in cash or in kind
- Unpaid family workers who produce economic goods or services for their own household consumption.

This definition excludes the following:

- Household chores, including fetching wood and/or water[9]
- Activities that are part of schooling.

While this definition of work is in line with international standards, there is currently an intense debate surrounding the exclusion of household chores, which can have a direct impact on child welfare. Besides the overall impact on child welfare, the exclusion of chores from the definition of

[8] Available at http://www2.ohchr.org/english/law/crc.htm

[9] SIMPOC-supported surveys have considered fetching wood and water as a work activity. However, in the Paraguayan context, it was considered that including those activities as household chores would facilitate understanding of the difference between work and chores.

work is likely to underestimate the impact of work on girls in particular, who may spend more time on household chores than boys spend on economic activities.

In order to address some of these concerns, in 2008 the International Conference of Labor Statisticians adopted a resolution aimed at promoting the measurement of hazardous household chores.[10] Several international experts and institutions are also promoting the inclusion of household chores above a certain number of hours in the definition of child work. The United Nations Children's Fund (UNICEF), for example, considers domestic chores performed 28 or more hours per week as child labor.[11] Policy research on this topic is beyond the scope of this project, but the interested reader can refer for example to the review on definitions of child labor conducted by Edmonds (2008) for ILO-IPEC[12] for a theory-driven perspective, or the review of the comparability of different child labor instruments done by Guarcello et al. (2010) for UCW,[13] for a more applied perspective.

There is also considerable heterogeneity on the definition of minimum age for work. While ILO Convention 138 (Article 2) specifies that "minimum age for work shall not be less than the age of completion of compulsory schooling and, in any case, not less than 15 years" (14 years is optional for developing economies), and not less than 18 years for "work which by its nature or the circumstances in which it is carried out is likely to jeopardize the health, safety or morals of young persons." However, specific types of work that fall under this category are left to the ratifying countries. In Paraguay, children under age 12 are not allowed to work. Those 12 and 13 years old may engage in light work with parental supervision in nonhazardous and nonindustrial working conditions. The minimum age for full-time employment is 14 years and 15 years for industrial work (Gobierno de Paraguay, 1994).

- **Operational Definition:** One of the goals of this study was to obtain a precise measure of the prevalence of child work in the sugarcane industry; another was compare children's work in sugarcane with children's work in other sectors. For this reason, information about work was collected in the following two ways:
  - Sugarcane work was measured by the question "Have you engaged in (*comprehensive list of sugarcane-related activities*) for at least 1 hour in the past 12 months?" A person is considered to having worked in sugarcane-related activities if she/he has done any activity for at least 1 hour in the last 12 months.
  - Non-sugarcane work was measured using a simplified version of the questions used in National Child Labor Surveys (NCLS) developed by SIMPOC, an agency within the International Programme on the Elimination of Child Labour (ILO-IPEC), to capture information on all children who work, whether in a traditional sense with an employee/employer relationship or in a more informal sense such as performing unpaid work for the family business. A person is considered to having engaged in non-sugarcane work if she/he has done any work for at least 1 hour in the last 12 months. See full detail in Table IV-2.

[10] Available at http://www.ilo.org/wcmsp5/groups/public/@dgreports/@integration/@stat/documents/meetingdocument/wcms_093696.pdf

[11] See for example http://www.unicef.org/protection/index_childlabour.html

[12] Available at http://www.ilo.org/ipecinfo/product/viewProduct.do?productId=11247

[13] Available at http://www.ucw-project.org/Pages/bib_details.aspx?id=12245&Pag=0&Year=-1&Country=-1&Author=-1

Reference Period

In line with child labor conventions, the last 7 days and last 12 months are the two reference periods used in the report. Both serve a purpose: the 12-month reference period provides a measure of seasonal work flows, children who work only during school holidays or sporadically, as demanded by family needs; and children who are involved in work only intermittently. The 7-day reference period helps determine regular work patterns among children and facilitates respondent's recollection of detailed questions on working conditions, allowing for a more in-depth analysis (ILO, 2004).

- **Operational Definition:** The reference period for sugarcane work was determined by the question: "When was the last time you engaged in (sugarcane-related activities performed in the last 12 months).
  - For the "last 7 days" reference period, the responses "yesterday or today" and "in the last 7 days" are aggregated.
  - For the "last 12 months" reference period, the responses "yesterday or today," "in the last 7 days," "in the last month," "in the last 3 months," and "in the last 12 months" are aggregated.

The reference period for non-sugarcane work was determined using a 5-item battery, based on a simplified SIMPOC methodology (Table IV-2).

Table IV-2. Non-Sugarcane Work Battery

Question	Categories
Have you done any work for at least 1 hour **since last (day of the week)**?	1. Yes—**Working in the last 7 days** 2. No
As you know, some people have jobs for which they are paid in cash or kind. Others sell things, have a small business, or work on the family farm or in the family business. **Since last (day of the week)**, have you done any of these things or any other work?	1. Yes—**Working in the last 7 days** 2. No
Although you did not work **since last (day of the week)**, do you have any job or business from which you were absent for leave, illness, injury, vacation, or any other such reason?	1. Yes—**Working in the last 7 days** 2. No
Have you done any work for at least 1 hour since **July last year**?	1. Yes—**Working in the last 12 months** 2. No
Although you did not work **since last (day of the week)**, do you have any job or business from which you were absent for leave, illness, injury, vacation, or any other such reason?	1. Yes—**Working in the last 12 months** 2. No

For the purpose of reporting, it is necessary to choose one reference period to be used consistently throughout. We have chosen to use the weekly reference period, because recall for the annual measure is likely to be less reliable and obscure the findings. It is important to note, however, that in some cases other measures of work are used when the logic of the survey instrument so dictates. For instance, if a child is asked how many months he/she worked in the past year, we use the child-reported 12-month measure as the base.

Prevalence

One of the key research objectives of this study is to obtain an estimate of prevalence of child work in the sugarcane industry. Prevalence is usually defined in the epidemiological literature as the ratio of the total number of cases with a certain condition (e.g., children working in sugarcane-related activities) to a total population (e.g., sugarcane workers).

- **Operational Definition:** The percentage of all workers in the sugarcane industry who are children. Number of children working in sugarcane industry (divided by) Total number of workers in the sugarcane industry. Prevalence is calculated using the two reference periods mentioned above: workers who performed sugarcane-related activities in the last 7 days and in the last 12 months.

Children in Worst Forms Conditions

ILO Convention 182 (ILO, 1999) defines the four WFCL to be eliminated immediately, including a) forced labor, b) commercial sexual exploitation, c) work in illicit activities, and d) hazardous work (Section IV. for the full definitions). Of these WFCL, b) and c) do not apply by definition to the sugarcane industry (it is neither illegal nor related to prostitution or pornography). Children in WFCL conditions in the sugarcane industry would be therefore a) those involved in forced labor, bonded labor, or trafficking and/or so-called "hazardous" work. Definitions for these subcategories are provided below.

Forced Labor

Article 2 of ILO Convention 29 (ILO, 1930) defines forced labor as "all work or service which is exacted from any person under the menace of any penalty and for which said person has not offered himself voluntarily." The 1956 Supplementary convention includes into practices similar to slavery "any institution or practice whereby a child or young person under the age of 18 years, is delivered by either or both of his natural parents or by his guardian to another person, whether for reward or not, with a view to the exploitation of the child or young person or of his labour" (p. 2). In the case of children, the definition of forced labor is not much different from that of trafficking (see definition below), except that less emphasis is placed on the "movement of the child."

Bonded Labor

The United Nation's 1956 supplementary convention (UN, 1956) defines debt bondage as "the status or condition arising from a pledge by a debtor of his personal services or of those of a person under his control as security for a debt, if the value of those services as reasonably assessed is not applied towards the liquidation of the debt or the length and nature of those services are not respectively limited and defined" (p. 1); it classifies bonded labor as a practice similar to slavery or forced labor.

Hazardous Work

Hazardous work is defined as work, which, by its nature or the circumstances in which it is performed, is likely to harm the health, safety or morals of children (ILO, 2002d, p. 20).

Recommendation No. 190 (ILO, 1999) specifies that particular consideration should be given to the following types of work:

- Work that exposes children to physical, psychological, or sexual abuse;
- Work underground, under water, at dangerous heights, and in confined spaces;
- Work with dangerous machinery, equipment, and tools, or which involves the manual handling or transport of heavy loads;
- Work in an unhealthy environment, which may, for example, expose children to hazardous substances, agents or processes, or to temperatures, noise levels, or vibrations damaging to their health; and
- Work under particularly difficult conditions such as work for long hours or during the night, or work where the child is unreasonably confined to the premises of the employer.

Trafficking

Child trafficking is defined in the UN 2000 Trafficking Protocol (UN, 2000) as "the recruitment, transportation, transfer, harbouring or receipt of a child for the purpose of exploitation". "Labor exploitation" is established by the previous "worst forms" categories, as well as any work done by children who are under the minimum age for admission to employment. Unawareness of the conditions of employment and use of force or deception would be additional indicators of typical trafficking situations; however, they would not be required to meet the minimum conditions for child trafficking.

V. METHODOLOGY

a. Research Questions

This study was designed to answer several research questions, which are addressed by specific sections of the report. Table V-1 shows the correspondence between each research question and the specific section of the report that addresses each particular question. Table headings within each section in turn indicate the specific research question they are addressing (indicated as "RQ #").

Table V-1. Research Questions and Corresponding Report Section

Research Question	Report Section
1. How prevalent is child work and child labor in the sugarcane industry?	VI.a
2. What are the demographic characteristics of children working in the sugarcane industry and their families?	VI.c
3. What are the household demographics, work status, and socioeconomic status of working children's families?	VI.c
4. What is the educational status of children working in the sugarcane industry?	VI.d
5. Are there particular educational barriers that make children more vulnerable to working in the sugarcane industry?	VI.d
6. What particular aspects of the sugarcane industry encourage or discourage the use of children?	III.a
7. What occupational safety and health hazards do children working in the sugarcane industry face and to what extent?	VI.e.ii.5
8. What percentage of children work for their families versus work as hired labor?	VI.e.ii.4
9. What are the typical hours of work?	VI.e.ii.2
10. How are children paid?	VI.e.ii.4.a
11. Does forced child labor or child trafficking exist in the sugarcane industry and if so, to what extent?	VI.g
12. To what extent do children migrate for work in the sugarcane industry?	VI.g.ii

b. Description of Research Methodologies

ICF Macro conducted a preliminary rapid assessment in the Department of Guairá in December 2010 to inform the research methodology for the full-scale quantitative survey (ICF Macro, 2011). During this exploratory phase, ICF Macro identified several potentially useful approaches to collect representative data on the research questions above, including household surveys, school surveys and worksite surveys. It was decided that household surveys represented the best option in terms of coverage, since all working children are expected to live with their families in households that are easily accessible for this sector. On the other hand, a household survey in this sector could potentially be affected by non-response bias. Field researchers found during the exploratory research that some children were not available at home because they were out in the fields. This was the case, even though the exploratory research was conducted in December, when sugarcane-related activities were relatively slow. After consultations with USDOL and FAyE, ICF Macro's local subcontractor in Paraguay, it was determined that, as long as strict callback protocols[14] were implemented to eliminate the potential for non-response bias, a household survey would represent the best approach.

[14] "Callbacks" are done when a member of a household selected for interviewing is not present at the time the household is contacted. They are necessary, to avoid replacing absent members with those who are present. Replacing respondents introduces selection bias, since it would give a higher probability of selection to household members who tend to be at home.

This study is based on the ILO SIMPOC general survey methodology, which includes a household survey that captures basic information on all members of the household, and children interviews with all children 5 to 17 years old residing in the household, to collect in-depth information on characteristics and conditions of work, health and work-related injuries, and other relevant issues such as educational experiences and attainment.

Finally, this study also included systematic observations of children in the act of working in sugarcane farms. These observations were done to obtain a qualitative complement to the quantitative survey, although the worksite observations were not conducted for a large enough sample to provide a robust reliability check on self-reports.

c. Questionnaires

This study included three questionnaires, namely—

a. **The Household questionnaire**[15] administered to a knowledgeable member of the household. This questionnaire contains seven main sections, including the following:
   I. Household Composition and Characteristics
   II. Education and School Attendance
   III. Work Status
   IV. Housekeeping activities
   V. Child health status
   VI. Household Assets, Dwelling Characteristics, Household Debt
   VII. Perceptions about work

b. **The Child questionnaire**[16] administered to all the children identified in the household survey. This questionnaire was split into two main modules, including a general module applied to all children, and a working child module applied to working children.
   1. **The general module** contains four main sections, including the following:
      I. Demographics
      II. Education
      III. Housekeeping activities
      IV. Work
   2. **The working child module** contains six main sections, including the following:
      I. Working Conditions
      II. Employment and School
      III. Health

[15] See Appendix D.
[16] See Appendix E.

IV. Migration and Trafficking

V. Forced Labor

VI. Abuse

c. **The Sugarcane worksite observation checklist**[17] to be filled while observing children's activities on sugarcane farms. This checklist contains six main sections, including the following:

I. Personal Data

II. Appearance of Injury/Disability

III. Emotional Appearance

IV. Work

V. Working Environment

VI. Physical Risks

These questionnaires, developed by ICF Macro in collaboration with USDOL, were designed in alignment with international child labor standards and definitions (Section IV), and integrate original items developed by ICF Macro with items and inputs from other sources, including the following:

- Model household and child questionnaires for SIMPOC National Child Labor Surveys (2007), by ILO-IPEC[18]
- Work and Health modules from the Demographic Health Survey questionnaires, by ICF Macro[19]
- Childhood Agricultural Injury Survey Among Youth on Farms in the United States (1998), by the Center for Disease Control/National Institute of Occupational Safety and Health (CDC/NIOSH)[20]
- SIMPOC Survey on children 5 to 17 years old in the Philippines (2001), by ILO-IPEC[21]
- Guidelines on Methodologies to Estimate the Prevalence of Forced Labour of Adults and Children (2011), by ILO-IPEC.[22]

The questionnaires were drafted in English and then translated to Paraguayan Spanish by a local translator from FAyE. Although it was expected that most respondents would feel more comfortable if they were interviewed in Guaraní, the other official language of Paraguay (besides Spanish), instruments were not translated to Guaraní. Guaraní is primarily an oral language and many Paraguayans, including professional interviewers, are not familiar with its written form. It is

[17] See Appendix F.
[18] Available at http://www.ilo.org/ipecinfo/product/viewProduct.do;?productId=4946
[19] Available at http://www.measuredhs.com/What-We-Do/Survey-Types/DHS-Questionnaires.cfm
[20] Available at www.cdc.gov/niosh/docs/2001-154/pdfs/2001154.pdf
[21] Available at http://www.ilo.org/ipecinfo/product/viewProduct.do;?productId=5084
[22] Available at: http://www.ilo.org/ipecinfo/product/viewProduct.do?productId=16495

standard practice in the Paraguayan research industry to use questionnaires in Spanish that are translated by the interviewer into Guaraní as needed during the interview.

Translations of questions into Guarani were, however, reviewed during the training session. Appropriate translations were discussed orally with the team until a consensus translation was reached. Team members were instructed to use these translations consistently during the interview. The final versions of the questionnaires shown in the annexes are the back-translation into English of the final fielded Spanish questionnaires.

d. Sampling

This study aimed to develop nationally representative estimates for key indicators related to the sugarcane industry, such as prevalence of child workers in the sugarcane industry. It was thus necessary to develop a scientific sampling approach based on a probability sample. That is, a sample where all elements in the population have a known, non-zero probability of being included in the sample. Using a probability sample permits the projection of the sample data onto the total population of interest with a known confidence level.

i. Sampling Frame

A necessary prerequisite to select a probability sample is to develop a sampling frame. A sampling frame can be defined as a list of all elements in the target population, in this case, sugarcane households. Developing a sampling frame is often the most difficult and/or costly phase of the sample design process. It is also one of the most critical aspects of any quantitative survey, as the representativeness of the whole study hinges on the accuracy and completeness of the sampling frame. ICF Macro conducted, at the beginning of the research design phase, an open exploration of all available sources that could potentially be used to create a robust sampling frame, including the following:

- 2002 National Census (*Censo Nacional de Población y Viviendas 2002, Dirección General de Estadísticas, Encuestas y Censos*)
- 2008 Agriculture Census (*Censo Agropecuario Nacional, Dirección General de Estadísticas, Encuestas y Censos*)
- 2010 Household Workforce Surveys (*Encuesta Contínua de Empleo, Dirección General de Estadísticas, Encuestas y Censos*)
- 2000-2001 Integrated Household Survey (*Encuesta Integrada de Hogares, Dirección General de Estadísticas, Encuestas y Censos*)
- 2010 Permanent Household Survey (*Encuesta Permanente de Hogares, Dirección General de Estadísticas, Encuestas y Censos*)
- Lists of sugarcane farms—*Centro Azucarero Paraguayo*.

These sources were explored with the corresponding contact persons using different means, including telephone, email, and personal interviews. For those sources that were available and

relevant, the lowest-level disaggregated data were collected, and the files were processed into an electronic spreadsheet format.

Once the different sources were collected, organized and evaluated, ICF Macro identified two sources from the Paraguay Statistical Office[23] useful in creating a sampling frame. In Paraguay, census data are available, both for the total population (2002 Population Census) and for the population of sugarcane farms (2008 Agriculture Census). This information can be disaggregated to the lowest-level Paraguayan administrative divisions.[24]

The Agriculture Census, in particular, appeared to be a particularly useful source to drive the selection of sugarcane-producing areas. It lists the total number of sugarcane farms in the country, down to the *compañía* level, including a total of 20,550 farms producing sugarcane for human consumption and 32,498 farms producing sugarcane for fodder. The focus of this research is sugarcane for human consumption; so, only the former 20,550 farms were a priori within the scope of this study. However, interviews with key informants during the sampling frame development phase indicated that, among the farms that primarily produce sugarcane for fodder (and listed as such in the Agriculture Census), an estimated 20 percent also produce sugarcane for human consumption. After making this adjustment, the estimated population of farms producing sugarcane for human consumption ("sugarcane farms") would add up to 27,016.

Estimations derived from the 2008 Agriculture census are shown in Table V-2. These estimates indicate that five departments in the country (Caaguazú, Caazapá, Cordillera, Guairá, and Paraguarí,) account for 76.0 percent of the total estimated number of sugarcane farms. These five departments had a total projected population of 1.4 million in 2011, representing slightly more than one-fifth of the total population of Paraguay. They contained a total of 173,542 rural households (based on the 2002 census), or about 38 percent of the rural households in Paraguay. The project decided for efficiency to cover only the areas dedicated to the production of sugarcane in these five departments.

Table V-2. Estimated Population of Sugarcane Farms

Departments	Estimated Population of Sugarcane-Producing Farms		
	N	%	Cum %
Guairá	9,115	33.8%	33.8%
Caaguazú	4,491	16.6%	50.4%
Paraguarí	2,718	10.1%	60.5%
Caazapá	2,443	9.0%	69.5%
Cordillera	1,754	6.5%	76.0%
San Pedro	1,300	4.8%	80.8%
Itapua	1,218	4.5%	85.3%
Misiones	1,012	3.7%	89.0%

[23] *Dirección General de Estadística, Encuestas y Censos.* Available at http://www.dgeec.gov.py/

[24] Paraguay is divided in 17 departments and the capital district. There are a total of 237 districts in the country; with an average of 14 districts per department (the Department of Guairá has 17 districts). Each district is further subdivided into urban and rural areas, and rural areas subdivided into *compañias*, which are the lowest-level administrative division. These administrative divisions have remained constant since the 2002 census. Both census and reliable GIS mapping data are available down to this level.

Departments	Estimated Population of Sugarcane-Producing Farms		
	N	%	Cum %
Central	843	3.1%	92.1%
Concepción	788	2.9%	95.0%
Ñeembucú	512	1.9%	96.9%
Alto Paraná	507	1.9%	98.8%
Canindeyú	178	0.7%	99.5%
Amambay	123	0.5%	100%
Total	27,016*	100%	

Source: National Agriculture Census of Paraguay (2008).
*Note that the total N is slightly higher than the sum of the N by department. Because of the estimative approach, the final number of sugarcane farms was often fractional, and the difference between the department N and the total N is due to rounding.

The estimates of sugarcane-producing farms from the 2008 Agriculture Census, disaggregated to the lowest-level administrative division, provide a sampling frame of sugarcane-producing areas that can be used to select a sample of *companies*,[25] with a known probability. This approach assumes that the geographic distribution of sugarcane households follows the distribution of sugarcane farms. Thus, sugarcane households would be found only in rural areas that have sugarcane farms.[26] Under these assumptions, this sampling frame would provide full coverage of the target population, with a complete listing of rural areas containing any sugarcane-producing households.

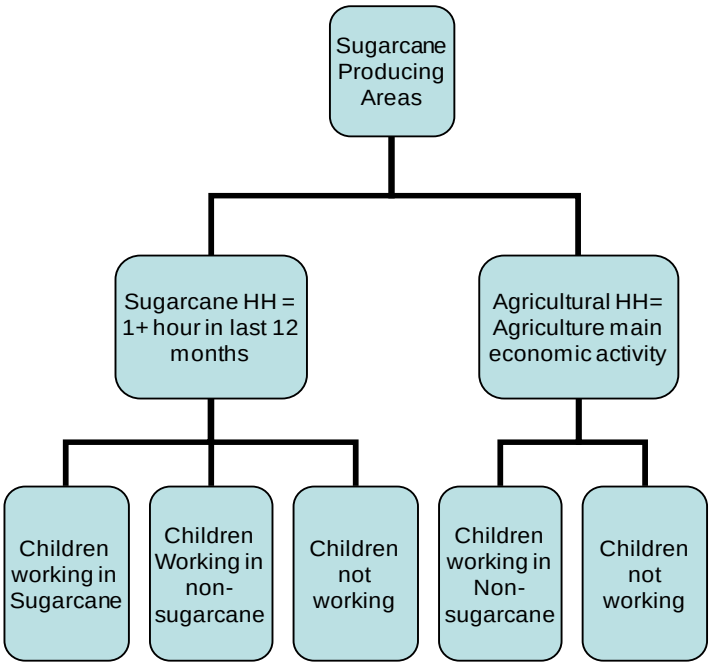
ii. Reference Groups

This study includes a sample of reference households that will serve as a comparison to sugarcane households, hereinafter referred to as agricultural households. This reference group helps put findings in context: within sugarcane producing areas, what are the differences between sugarcane-producing households and non-sugarcane-producing households? Are there any differences between sugarcane households and reference households in terms of household composition, wealth, and head of household demographics or attitudes towards child work? Besides household level indicators, this reports draws child-level comparisons among three child reference groups: children working in sugarcane, children working in other non-sugarcane activity, and children not working (the latter two groups include children from both sugarcane and reference households). These reference groups will help us explore questions such as: What are the differences we find between children working in sugarcane versus children working in other activities in the survey population? What are the differences in their working and living conditions? Are their educational and health outcomes at all different? These comparisons are important in order to assess whether children in any given occupational situation are better or worse-off than their neighbors.

[25] Note that all sugarcane farms in the 2008 Agriculture Census are located at the *compañía* level. As noted earlier, *compañías* are the lowest-level administrative division applied to rural areas. By implication, all sugarcane farms are located in rural areas.
[26] Interviews with key informants and exploratory field research indicate that these assumptions are robust, although there may be a marginal number of households in small urban areas that migrate to work in sugarcane farms in the surrounding rural areas.

Defining the exclusion criteria for reference households was straight forward: a reference household cannot have any member working in sugarcane related-activities in the last 12 months. Defining the inclusion criteria for reference households was however more challenging. The inclusion criteria would determine to what extent the reference households would provide a good comparison to the sugarcane households. The sugarcane-producing areas under study have a very limited range of economic activities. Our exploratory research and interviews with key informants indicate that most households in sugarcane-producing areas are either involved in sugarcane-related activities, other agricultural work or retail. Initially the project considered including households working in sugarcane whose children were not working as a comparison. It was however judged during the design phase that these households would be very rare and difficult to find. The research team determined that the best reference group in these areas would be households that are engaged in non-sugarcane agriculture as their main economic activity. The resulting sampling design, including the inclusion criteria for both household and child-level reference groups, is presented in Figure V-1.

Figure V-1. Sampling Design Implemented in the Study



The focus on agriculture as the main economic activity was chosen based on qualitative observations during the exploratory phase and discussions with the local research agency. It was believed that households that are engaged in agriculture for at least one hour during the reference period would be of higher socio-economic status than sugarcane households, and therefore less comparable. Sugarcane work appears to be done mostly by families in the lower socio-economic strata, whereas nearly all the families in the areas surveyed, irrespective of socio-economic status, appear to have at least a vegetable garden, some livestock or other minor involvement in agriculture. Households whose main economic activity is agriculture on the other hand would be of similar socio-economic status as sugarcane households, and should be relatively similar to sugarcane households. However, this determination was made qualitatively, and since sugarcane households were defined as working in sugarcane one or more hours in the last year, this group included sugarcane households with other primary economic activities besides sugarcane, while the reference group did not include households with primary economic activities other than agriculture.

It is also important to note that the selection criteria for this study excluded households that are not working in sugarcane or whose main economic activity is not agriculture. It is therefore likely that the study excluded part of the population of children working in agriculture, as well as other sectors, because children could be working in agriculture even if agriculture was not the main household activity. This eliminates the possibility of using children in agricultural work as a

reference group, as that full population was not captured. Further discussion on the proportion of households excluded and the resulting limitations can be found on Section VIII.

Besides the direct comparison between households (sugarcane households vs. households in other agricultural activities), comparisons are done at the individual child level. Children are classified into different reference groups (Table V-3), depending on their occupational status. These different reference groups allow us to discuss whether children appear to be better off if they work in the sugarcane sector, work in other sectors or do not work. These comparisons allow for greater analytical insight into the living and working conditions of different groups of children.

Table V-3. Reference Groups of Children in Sugarcane-Producing Areas

Occupational Group	Key Insight
Sugarcane Working Children	Demographic characteristics, socioeconomic status, educational achievement and working conditions of children working in sugarcane.
Other Working Children*	In the survey population, is working in other sectors better than working in sugarcane? Do children in other work have better or worse working conditions, health and educational outcomes?
Non-Working Children*	In the survey population, is not working at all better than working in sugarcane? Do children that are not working have better or worse health and educational outcomes?

*Other working children and non-working children are aggregated results from both sugarcane and reference households.

iii. Sampling Plan and Final Sample

Sample size was calculated to be 1,000 households within the five departments selected, to ensure an adequate representation of children between 5 and 17 years of age, split into sugarcane and reference households. As mentioned in Section IV, a sugarcane household, for the purpose of this study, consists of any household where at least one person has been involved in sugarcane-related activities for at least 1 hour in the last 12 months. A reference household is defined as a household whose main economic activity is agriculture. Given the way target households are defined, the sample is representative of the population of sugarcane households and their members, as well as households whose main activity is agriculture and their members in sugarcane-producing areas of Paraguay.

This sample of 1,000 households is split into 600 sugarcane households and 400 reference households. Although equal group sizes are typically recommended to maximize the statistical power of between-groups comparisons (Cohen, 1988), having balanced group sizes would limit the sample size for the sugarcane household group, reducing the accuracy of the estimate of the population of sugarcane households and, as a result, of the population of children working in sugarcane. For this project, it was determined that an accurate estimate of the population of children working in sugarcane-related activities was more important than establishing statistical differences with the reference group; so an unbalanced split was chosen (600/400) to reflect these priorities. The final sample collected data on 1,002 households, including 2,674 adults and 1,462 children (ages 5 to 17). According to the type of household, this sample is split into 1,667 adults and 983 children living in 596 sugarcane households, and 1,007 adults and 479 children living in 406 reference households.

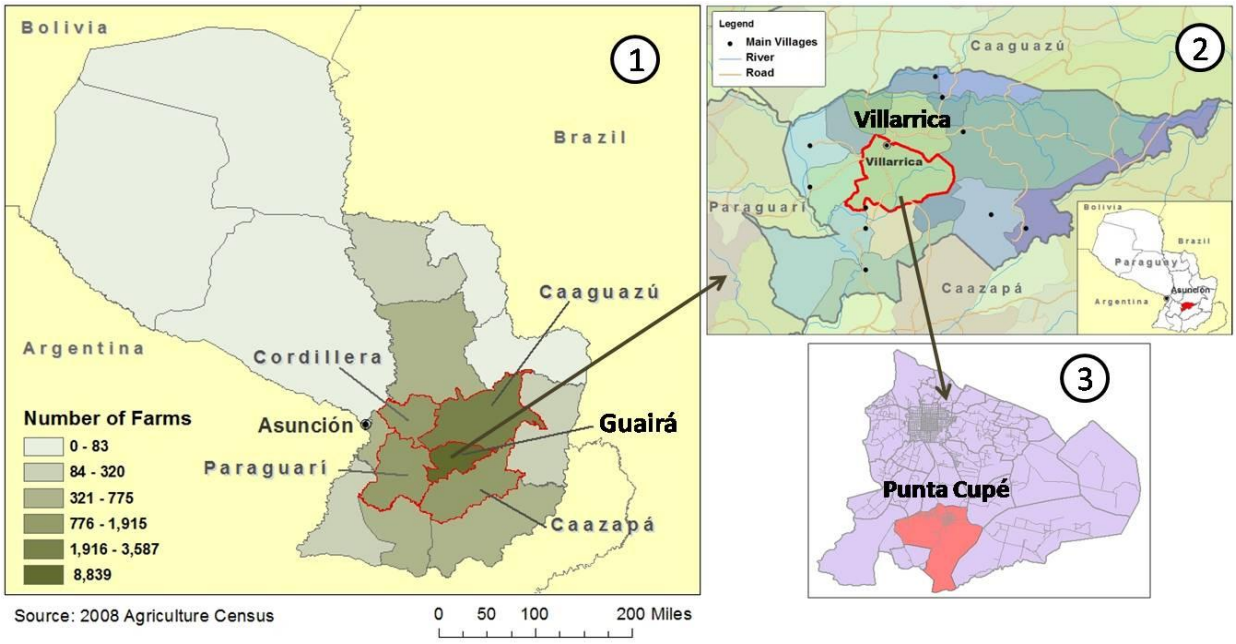
In order to design an efficient sample, a stratified, multistage cluster design was used to select households and individuals within those households. A multistage cluster design is used when there is limited information about individual units within a sampling frame, but information is

known about higher-level population aggregations. In this case, we do not have a listing of sugarcane and reference households, but we have a listing of administrative units with their corresponding number of sugarcane farms. Given population data are available, probability proportionate to selection (PPS) methods are used to ensure that households and individuals within those households have equal, or as close to equal, probability of selection (P). The following specific steps are followed to select respondents for this study:

- **Selection of Primary Sampling Units and Secondary Sampling Units**
  1. Stratified sample, by department, proportionately to the estimated number of sugarcane farms in each of the five departments.
  2. Within each stratum (department), selected primary sampling units (PSUs), in this case districts, with probability proportional to the estimated number of sugarcane farms in each PSU.
  3. Within each selected PSU, selected secondary sampling units (SSUs) (in this case, *compañías*) with probability proportional to the estimated number of sugarcane farms in each SSU.

     Figure V-2 shows the steps involved in selecting a SSU. First, we proportionately stratified by department based on the number of sugarcane farms. Outlined in red are the five departments that were selected for this project. Second, within each stratum (in the example, the Department of Guairá), we selected PSUs (districts) with PPS. And third, within each PSU (in the example, Villarrica), we selected SSUs by PPS. In this case, the *compañía* sampled was Punta Cupé.

Figure V-2. PSU and SSU Selection Steps



- **Selection of Tertiary Sampling Units**

  1. Households are the tertiary sampling units (TSUs). A fixed number of 12 sugarcane and 8 reference households had to be selected at random within each SSU to keep probabilities of selection constant.[27] This random selection was achieved using the methodology described below:

     a. Before visiting the SSU, field supervisors defined the enumeration areas (EAs) in each SSU. An EA is the populated area to be covered by a team of interviewers in a given SSU. EAs were identified using (GIS) maps overlaid on satellite imagery from Google Earth. This allowed the field supervisor to determine the location of the populated areas and their relative size, as well as the administrative boundaries of the SSU and landmarks to facilitate the visual identification of the EAs on the field.

     b. Once the EAs were defined, the field supervisor identified them in the field, assigned an EA to each field team, and ensured that each team knew the boundaries of the EA and did not trespass them.

Figure V-3. Definition of EAs in a SSU
(Punta Cupé *compañía*, Villarrica district, Department of Guairá)

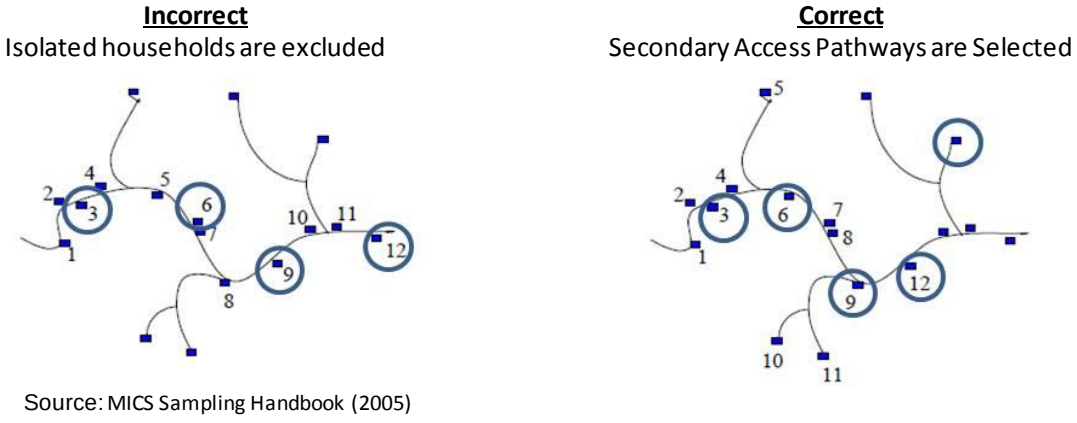
Source: GIS data from DGEEC and satellite imagery from Google Earth.

     c. Random Walk: Once the team reached the EA, the field supervisor assigned a starting point to each team based on some visually salient landmark (a church, a store, a crossroad, etc.). The supervisor then assigned a random starting direction, either spinning a bottle if multiple directions were possible, or flipping a coin if only two directions were possible (typical in many Paraguayan *compañías* where

[27] In a PPS sampling design, larger clusters have greater probability of being sampled, in our case down to the SSU. These greater probabilities are compensated within the SSU by selecting the same number of TSUs in every SSU, meaning that TSUs in larger SSUs have a proportionately smaller probability of being selected. The two unequal probabilities of selection at the SSU and TSU levels cancel each other out, so that each household in the population has the same probability of being sampled.

households are lined up along the road crossing the *compañía*). The team then would typically select every third household.[28] Empty dwellings were not included in the skip pattern. Typically, most dwellings in this context contain a single household, which facilitates keeping track of households in the skip pattern, although sometimes multi-household compounds had to be explored to determine the number of households and the corresponding skip. The random walk continued from the initial selection, exhausting every turn in the road, including any pathway that may lead to a household.

Figure V-4. Example of Correct and Incorrect Random Walk



Source: MICS Sampling Handbook (2005)

- **Selection of Respondents**

  1. An informed adult in each household selected in the random walk was then screened to identify sugarcane households, reference households and non-applicable households (see Household Screener in Appendix C). The outcome of each contact was registered in the field log.
  2. In each target household, a well-informed adult who knew the activities and background of each member of the household was interviewed for the household questionnaire. If an appropriate respondent was not available at the time of the visit, at least two callbacks were done to ensure all selected households were contacted.
  3. In each target household, every child 5 to 17 years had to be interviewed for the child questionnaire. If a child was not available at the time of the visit, at least 2 callbacks were done to ensure that all children were interviewed.

- **Selection of Worksites**

  1. In each SSU, the team identified an active worksite (a sugarcane farm where children 5 to 17 years old are performing sugarcane-related activities) to conduct a worksite observation. The identification of worksites was done qualitatively, via local informants.

[28] The number of skips could be modified depending on the population size of the *compañía* and the EA. In EAs with low populations, the skip pattern might be two or even one household. Some *compañías* were so small that the teams had to canvass the entire *compañía* to reach the target sample.

e. Fieldwork

i. Interviewer and Supervisor Training

Interviewer and supervisor training was conducted between July 4 and 11, 2011, in FAyE's offices in Asunción, the Paraguayan capital. Training was designed by ICF Macro and conducted by the ICF Macro PR and the FAyE field supervisors, and was observed by two USDOL representatives.

Initially, 5 days were allocated for interviewer training and questionnaire piloting. FAyE designated three field supervisors for the project and selected 30 interviewers to begin training. Interviewers were recruited based on their previous work experience with FAyE and their proficiency in Guaraní.

The training was conducted in Spanish; it included an overview of the project, a detailed explanation of the survey concepts and questions—as well as information on definitions of Child Labor, Forced Labor and Child Trafficking—research ethics, the informed consent process, and a review of good interviewing practices both for adults and children. After these introductory topics, the training was eminently applied, with a review of sampling methodologies, survey forms and questionnaires, immediately followed by hands-on group exercises. Specific focus was given to the item-by-item review of the questionnaires to ensure—

- Adequate understanding of the survey procedures and questionnaire items.
- Review and discussion of all questions and terms on the questionnaires, to ensure adequate understanding of specific terms and the appropriateness of the Spanish translations.
- Review of the Guaraní translations to be used on the field, to ensure all interviewers use adequate and consistent terms.

Each of these reviews was followed by role-play interviews, with trainees interviewing one another. Each trainee was expected to conduct two full interviews with each of the forms. After the role-playing sessions, a debriefing session was held to provide critical feedback on common mistakes and receive input and suggestions from the interviewers. Finally, a simulated practice was done for the worksite observations: interviewers were provided with pictures of children and adults working on actual sugarcane farms, which the interviewers had to code on the worksite observation forms and then review with the team for accuracy and feedback. Additional training was conducted with field supervisors to review fieldwork management practices, mapping of EAs, and quality control procedures.

A training manual with all the topics shown on the training agenda was developed to support the training session and to serve as a reference for the interviewers and supervisors on the field. The training manual, developed directly in Spanish, is available upon request.

ii. Questionnaire Piloting

Immediately after training, the research team conducted a complete pilot test of the survey in Arroyos y Esteros, a department near Asunción with significant cultivation of sugarcane. The Spanish-translated forms and questionnaires were pilot-tested by supervisors and interviewers with

a subset of households, children and worksites. This pre-test was conducted to identify potential problem areas, such as whether—

- Random walk and household selection routines were sufficiently understood and correctly implemented.
- Field logs were filled out correctly.
- The coded response categories on the questionnaires were sufficient, or new categories needed to be added.
- Respondents were willing to answer questions, given the way they were being asked.
- The questions were easily understood.
- The questions were interpreted in the same way by all concerned.
- The sequence of questions presented to respondents was logical.
- Questionnaires were clear in terms of both coding and instructions to enumerators.
- Any of the questions was particularly difficult or sensitive.
- The average amount of time required per interview was appropriate.

Three teams of eight interviewers each were available to conduct the pilot test. Each interviewer was expected to conduct two interviews with the household questionnaire and two interviews with the child questionnaire.

The pilot test identified additional corrections to the questionnaire, as well as a need for additional interviewer practice, particularly with the field log and the household questionnaire. The ICF Macro research team decided to add another day of interviewer practice before launching fieldwork, to ensure interviewers were sufficiently familiarized with the forms. Despite this additional practice, some interviewers had to be dismissed by the end of the additional training day, as they were not sufficiently proficient in the interview process.

iii. Fieldwork Supervision

Fieldwork was launched on July 12, 2011 in the department of Paraguarí, and was completed on August 12, 2011. During the first week of fieldwork, the ICF Macro PR provided direct supervision of fieldwork to ensure a smooth launch, to monitor the work of the field supervisors and to clarify any last-minute questions or difficult cases. USDOL representatives also observed fieldwork during the first week. Besides this direct supervision, ICF Macro demanded that rigorous quality protocols be implemented for quantitative surveys. The following quality control procedures were applied by the field supervisors:

- Spot-check at least 10 percent of all interviews.
- Back-check to verify the information collected in a random number of at least 10 percent of questionnaires. When possible, back checks can be done by telephone.

- Field edit of all questionnaires: Every completed questionnaire was inspected by the field supervisors on the day of data collection, to check for adequate completion, missing data, and legibility of open-ended items.

Once questionnaires were completed and checked on the field, they were processed centrally in FAyE's offices. The following procedures were used for data processing:

- Office editing. Upon receipt of the questionnaires at the central office, every completed questionnaire was inspected by the office editors to check for adequate completion, missing data, and legibility of open-ended items.
- Coding open-ended questions. After thorough editing the questionnaires, common themes for open-ended questions were identified and coded in the office.

iv. Challenges During Fieldwork

Rural Paraguay is a welcoming environment for research, so the field teams experienced few challenges to access the target population. However, some challenges arose during fieldwork; they were primarily related to the completion of the target samples, as described below:

- Many *compañías* turned out to have fewer households than expected. They might either have been small to begin with or might have experienced heavy emigration of late. Completing the target sample of sugarcane or reference households in these *compañías* sometimes represented a challenge and required the use of replacements.
- Reference households were often hard to find. In many of the SSUs selected, most agricultural households would be involved at some point in sugarcane-related activities. While this is not surprising—considering that the sample was chosen with probability proportional to the number of sugarcane farms in the SSU—finding enough reference households to meet the target sample often represented a challenge and required extensive household screening, long after the sugarcane household sample had been reached, or even the use of replacement *compañías* and districts.
- Worksite observations were also hard to complete and required an extension of the fieldwork days. The data collection period was unusually rainy and cold, so the sugarcane harvest was often on hold at the time of the teams' visit. Additionally, the rainy weather meant that some of the secondary roads used to reach the farms were in particularly bad conditions, which led to several mechanical problems with the vehicles used.
- Often, some children were not home and could not be located after two callbacks. This led to a greater than desired non-response rate among children, particularly older children who were working (see Section V.e.vii for a more detailed discussion).[29]

[29] It is important to note that conducting back-checks through a mode (telephone) other than the main mode of the research (face-to-face interviews) may have led to different responses to the same questions due to mode effects (Dillman, et al., 2010). Estimating these effects was outside the scope of this study.

v. Data Processing

Questionnaires were entered using Microsoft Access forms explicitly designed to handle each specific questionnaire. The ICF Macro PR reviewed these applications with FAyE's IT team to ensure the adequacy of the data entry process, the data structure, and the logic checks built into the applications. Data entry was conducted according to the following procedures:

- Perform double data entry and resolve all inconsistencies found between both entries.
- Produce the correct dataset structure and output in SPSS format.
- Conduct quality checks of the final datasets by verifying the following items:
  - That collected samples match the sampling plan;
  - The completeness of variables, labels, and codes;
  - That correct filters and skip patterns were applied for each question;
  - The plausibility of frequency distributions;
  - That different datasets can be linked unequivocally using unique individual and household identification variables.

Additionally, ICF Macro requested FAyE to produce a mock set of SPSS data files from the first batch of questionnaires received from the field, to ensure the adequacy of batch data processing, SPSS data structures, and labels ahead of the final deliverables.

ICF Macro implemented further quality control measures on the final datasets to check for match to the sample plan, duplicate records, data completeness (e.g., variables, labels, missing data), data validity (e.g., frequency distribution anomalies, out-of-range values), data consistency (e.g., interviewing dates and duration of interview, correspondence between the number of interviews at each level, skip patterns). Finally, ICF Macro created all computed variables, including variable recodes (age, education, etc.), work status variables, a household wealth index, as well as population weights for each dataset.

vi. Final Sample and Response Rates

Table XI-3, Appendix A, shows the initial and final sampling plans achieved, by district. The sampling plan was, by and large, implemented strictly. Sometimes, however, the SSUs selected would not contain sufficient sugarcane or reference households to meet the sample plan.[30] In those cases, additional SSUs were selected using the same PPS methodology described above. The process of drawing replacement SSUs was controlled centrally by ICF Macro to avoid convenience sampling.

[30] It must be noted that, while households were screened using the short two-item module shown in Appendix C, the final status of a household was determined based on the full household interview. That is, if any household member was identified as a sugarcane worker during the interview, the household is considered a sugarcane household, both for the purposes of the final sample achieved, shown in Table XI-3, and for weighting and reporting purposes. The screener proved in any case to be quite reliable, and only four households had to be reclassified after the full interview.

A sound sample does not only require an adequate design and a sufficient effective sample size. It is also important to analyze response rates and non-response patterns, since non-response can undermine the representativeness of the sample if non-respondents differ from respondents on any variables of interest. In our survey, two stages of the sample selection process can be affected by non-response: 1) household interviews and 2) children interviews. Table V-4 shows the outcomes of all household-level contacts carried out during the survey. The total response rate[31] was 86.5 percent, which can be considered good by international standards.[32] There do not appear to be large discrepancies in response rates by department, with Guairá showing the lowest response rate (83.8 percent) and Caazapá the highest (92.9 percent). Most non-responses occurred because a household member was unavailable, even after two callbacks or a total of three contact attempts. Rejection rates[33] were very low, with an overall rate of 2.4 percent.

Table V-4. Household-level Response Rates

Outcome	Cordillera	Guairá	Caaguazú	Caazapá	Paraguarí	Total
No household member available after 3 attempts	12	119	29	7	22	189
No appropriate respondent available after 3 attempts	0	5	0	0	1	6
Household members away for a prolonged period of time	0	0	10	0	1	11
Rejected	1	15	10	7	5	38
Total Unsuccessful Contacts	**13**	**139**	**49**	**14**	**29**	**244**
Completed, but quota already filled	26	200	44	50	57	377
Completed	108	521	280	132	148	1189
Total Successful Contacts	**134**	**721**	**324**	**182**	**205**	**1,566**
Total Contacts	**147**	**860**	**373**	**196**	**234**	**1,810**
Response Rate	**91.2%**	**83.8%**	**86.9%**	**92.9%**	**87.6%**	**86.5%**
Rejection Rate	**0.7%**	**2.0%**	**3.0%**	**3.7%**	**2.4%**	**2.4%**

Since this study had different units of analysis, i.e. households and children, it is also important to analyze non-response patterns for the children interviews. Out of the total 1,002 households sampled, the study identified a total of 1,461 children between 5 and 17 years of age. A total of 1,135 children could be reached for interview after a maximum of three attempts, representing a raw response rate of 78 percent. Although this response rate is acceptable, it is quite possible that non-response might be correlated with specific variables of interest, such as occupational status or school attendance: children working or in school will be away from the household more often than children who are not, which may make the former more prone to non-response. It is therefore particularly important to check for any non-response patterns that may have biased the final sample of children interviewed in a significant way. Non-response patterns are analyzed by computing the non-response rates for different demographic, educational, or occupational categories. Non-response bias would be evidenced by a heterogeneous distribution of non-responses across different categories. Table V-5 shows non-response rates across key domains, along with the

[31] Calculated as the number of total successful contacts with eligible units over total contacts with eligible units, or 1,810 over 1,566,

[32] See, for example, Johnson & Owens (2003).

[33] Calculated as the number of rejected interviews over the sum of total successful contacts and rejected interviews, or 38 over 1,604.

corresponding *p*-values of the chi-square homogeneity tests. Non-response bias is immediately apparent, with greater non-response rates among older children, boys, children not attending school, and sugarcane workers. This pattern is consistent with the earlier hypothesis of greater non-response among "busier" children. The research team indeed anticipated having a harder time finding sugarcane children at home because of the timing of the harvest season. Even though strict callback routines were implemented to minimize this problem, older children working in sugarcane-related activities would sometimes go to work on distant fields for weeks, making it impossible for the field teams to locate them. However, this bias can be adjusted with the information collected from the household informant, which allow us to estimate the features of the population of children, even absent ones. This information can be used to develop post-stratification weights, which are discussed in the following section.

Table V-5. Child-level Non-Response Patterns

	Non-response Rate	*p*-value
Gender		
Male	24.7%	<0.01
Female	16.0%	
Age		
5–8	11.0%	<0.01
9–11	19.4%	
12–13	22.9%	
14–17	28.7%	
School Attendance		
Attending	19.2%	<0.01
Not attending	32.7%	
Work status in the last 7 days		
Sugarcane worker	34.1%	<0.01
Non-sugarcane worker	19.7%	
Not working	18.0%	

vii. Weighting

The sample design described above provides a priori an equal probability of selection method (epsem), and is therefore self-weighting. However, in reality, selection probabilities were uneven for the two following reasons:

1. At the household level, the final probabilities of selection were in reality based on a different measure of size (MoS) at the SSU and TSU levels. SSUs were selected with probability proportional to the number of sugarcane farms in the SSU. However, this MoS was different from the number of actual sugarcane households in the SSU. For a PPS design to be epsem, probabilities of selection (P) must be based on the same MoS at the SSU and TSU levels; so a weight adjustment is required to compensate for the unequal P.
2. At the child level, all children in a household were selected, so their P was equal to that of the household. However a total of 326 children identified in the households (HHs) sampled could not be interviewed. As we have seen earlier, this child non-response also appeared to

be non-random. Children interviews were therefore given a final weight adjustment to compensate for these differential non-response patterns.

A final weighting component is the overall inflation factor, which is required to extrapolate the sample data collected to represent the population estimate or country total.

The weight computations for households and children are described below. These weights are used to extrapolate the sample to the population.

Household Weights

Since the survey sample is a three-stage stratified cluster sample, sampling weights will be calculated based on sampling probabilities separately for each sampling stage and for each cluster. We use the following notations:

- P_{sd}: PSU weight, or first-stage sampling probability of the d^{th} district in stratum *s*
- P_{dc}: SSU weight, or second-stage sampling probability of the c^{th} *compañía* in district *i*
- P_{ch}: TSU weight, or third-stage sampling probability of the h^{th} household in *compañía c*

PSU weight:

Let a_s be the number of districts selected in stratum s, M_{sd} the total population of sugarcane farms according to the sampling frame in the d^{th} district, and $\sum M_{sd}$ the total population in the stratum *s*. The probability of selecting the d^{th} district is calculated as follows:

$$P_{sd} = \frac{a_s \, M_{sd}}{\sum M_{sd}}$$

SSU weight:

Let b_d be the number of *compañías* selected in district d, M_{dc} the total population of sugarcane farms according to the sampling frame in the c^{th} *compañía*, and $\sum M_{dc}$ the total population of sugarcane farms in district *d*. The probability of selecting the c^{th} *compañía* is calculated as follows:

$$P_{dc} = \frac{b_d \, M_{dc}}{\sum M_{dc}}$$

TSU weight:

At the TSU level, the real probability of selection of sugarcane household *h* in *compañía* c depends on the total number of sugarcane households in the *compañía*, rather than the number of sugarcane farms identified in the sampling frame. This number is initially unknown. However, during the household screening process, field teams collected information on a random subset of households that can be used to produce a ratio estimator of the total number of sugarcane households in the

compañía.[34] Let C_h be the number of sugarcane households contacted in *compañía c*, c_h be the number of sugarcane households sampled in *compañía c* (by design, $c_h = 12$) , m_{ch} the total number of households h screened in *compañía c*, and M_{ch} the total number of households in *compañía c*. The probability of selecting the h^{th} sugarcane household is calculated as follows:

$$P_{ch} = \frac{c_h \, m_{ch}}{C_h M_{ch}}$$

Note that C_h and c_h will be equal whenever the target sample of reference households is reached before the target sample of sugarcane households. In this case, the field teams would finalize the *compañía* screening process as soon as the 12th sugarcane household is identified and completed, so C_h and c_h will be equal. However, if the target sample of sugarcane households was reached before the target sample of reference households, the field teams would need to continue screening households to find the remaining reference households, but would not interview any additional sugarcane households found during the screening process, which would make C_h and c_h to differ. Also, whenever a sugarcane household that is identified as such during the screening process subsequently refuses to be interviewed or is not completed for any other reason, C_h and c_h will differ. Finally it must be noted that C_h, c_h, and m_{ch} are obtained from the field logs kept during the screening process. However, since this study did not conduct a full listing of households at the SSU level, M_{ch} is obtained from 2011 projections of the 2002 census data.

Finally, the overall selection probability of each household in *compañía c* of district *d* of stratum *s* is the product of the three stage selection probabilities:

$$P_{hi} = P_{sd} \times P_{dc} \times P_{ch} = \frac{a_s \, M_{sd} \, b_d \, M_{dc} \, c_h \, m_{ch}}{\sum M_{sd} \sum M_{dc} \, C_h M_{ch}}$$

The design weight for each household in *compañía c* of district d of stratum s is the inverse of its overall selection probability:

$$W_{hi} = 1/P_{hi} = \frac{\sum M_{sd} \sum M_{dc} \, C_h M_{ch}}{a_s \, M_{sd} \, b_d \, M_{dc} \, c_h \, m_{ch}}$$

The household weights described above would correspond specifically to sugarcane households. The computations would be similar for reference households, with the only exception that the TSU weight would be computed with Ch as the number of reference households contacted in *compañía d*, and c_h as the number of reference households sampled in *compañía d* (by design, $c_h = 8$).

Final Household weights were normalized[35] to examine the presence of extreme weights and to avoid inflating degrees of freedom for statistical tests artificially. Descriptive statistics for these

[34] This household screening process represents a two-phase sampling methodology typically used in epidemiological studies (Kalton, 2009), where we contact a larger sample *N*, which includes a final sample *n*, selected for its specific attributes of interest—in this case, the presence of any sugarcane worker or main occupation of the household.

[35] Weights are normalized multiplying each weight by (Unweighted *N*)/(Weighted *N*), or dividing each weight by the mean population weight. Both procedures are mathematically equivalent and produce a normalized weight with a mean of 1.

normalized weights are shown on Table XI-1 (Appendix A). Extreme weights are undesirable, as they can inflate the variances of the survey estimates. There are, however, no strict rules about what represents an extreme weight. One criterion is to identify any weight bigger than the median weight plus 5 or 6 times the inter-quartile range.[36] According to that criterion, weights over 5.49 would be considered extreme. Although most weights were within acceptable norms, as shown by the 5th and 95th percentile value, there were some extreme weights, particularly for reference households. Such extreme weights, which can represent a detrimental increase in variance, require special procedures, such as trimming or raking. Following Verma's recommendation (Verma, 2007, p. 222), the household weights were trimmed so that the ratio of the largest to the smallest case weight would not exceed 5, with a post-stratification adjustment to keep the sum of weights constant, by type of household (sugarcane/reference) at the department level.

- **Children Weights**

Note that since all children in the household are selected, children automatically have the same probability of selection as the household, and therefore the same design weight. However, child-level non-response introduces differences between the household sampling weights and the individual sampling weights. As we have seen in Section V.e.vii., these differences were also non-random, biasing the sample on several key factors, including sex, age, school attendance, and occupational status. It is not sufficient to adjust the sample on any one factor; all of these factors are critical for our analysis and should be controlled simultaneously. However, developing straight non-response weights for each subcategory (e.g., 14 to 17-year-old sugarcane working girls who are not attending school) can result in small adjustment cells and large variations in the resulting weights. The preferred solution in this situation is to develop raking weights (Deming, 1943 or Verma, 2008). This procedure re-weights the sample, one control variable at a time, to match its distribution to that of the population, repeating the process iteratively until all variables are adjusted simultaneously.

Table V-6 shows the effect of raking on the sample of responding children. The first column indicates the value of the population ("Total children in the household"). Respondents, if weighted only using sampling weights ("Child respondents"), show a different distribution on all the key variables. After raking, the distribution is nearly identical to the total population, despite the effect of non-response.

Table V-6. Child Respondents Before and After Raking

	Sampling weights		Sampling weights + raking
	Total children in the household	Child respondents	Child respondents
Gender			
Male	55.1 %	51.7%	55.0%
Female	44.9%	48.3%	45.0%
Age			
5–8	27.7%	31.1%	27.7%
9–11	23.3%	23.6%	23.3%
12–13	17.1%	16.6%	17.1%

[36] See Izrael, Battaglia & Frankel (2009).

	Sampling weights		Sampling weights + raking
	Total children in the household	Child respondents	Child respondents
14–17	31.9%	28.7%	31.9%
School Attendance			
Attending	88.3%	90.0%	88.3%
Not attending	11.7%	10.0%	11.7%
Work Status in the Last 12 Months			
Sugarcane worker	21.4%	18.7%	21.3%
Non-sugarcane worker	22.8%	23.0%	22.8%
Not working	55.8%	58.3%	55.8%

As with household weights, final children weights were normalized to conduct statistical significance tests. Since the child weights were developed from the trimmed household weights, extreme weights are not a concern. Descriptive statistics for these normalized weights are shown in Table XI-2 (Appendix A).

viii. Reliability of Estimates

The figures presented in this report are based on samples and are therefore subject to sampling error, which can be calculated on the basis of the standard error of a given estimate. Given the complex sampling design used in this survey, it would be too time-consuming to compute the sampling error for every figure in the report. It is however useful to present as a guideline the sampling errors for key indicators and populations. Table V-7 shows key estimated populations with their corresponding standard errors, confidence intervals, and coefficients of variation (CV)—another measure of dispersion. As an example, the 12-month prevalence rate of children in the sugarcane industry (28.0 percent) would have a 95 percent C.I. of +/- 2.8 percent, indicating that we are 95 percent confident that the true population parameter lies between 25.3 and 31.0 percent.

Table V-7. Variance Calculations for the Main Survey Populations

Occupational Group (last 12 months)			Estimate	Standard Error	95% CI		CV	Unweighted Count
					Lower	Upper		
Sugarcane Worker	Population Size	Adult (18 or older)	140,966	10,853	118,910	163,021	.077	987
		Child (5–17)	54,928	6,698	41,315	68,540	.122	360
		Total	195,893	16,920	161,507	230,280	.086	1,347
	% of Total	Adult (18 or older)	72.0%	1.4%	69.0%	74.7%	.019	
		Child (5–17)	28.0%	1.4%	25.3%	31.0%	.050	
		Total	100.0%	0.0%	100.0%	100.0%	.000	
Other Worker	Population Size	Adult (18 or older)	175,542	9,005	157,241	193,842	.051	917
		Child (5–17)	57,097	7,147	42,572	71,622	.125	278
		Total	232,638	13,153	205,909	259,368	.057	1,195
	% of Total	Adult (18 or older)	75.5%	2.2%	70.7%	79.7%	.029	
		Child (5–17)	24.5%	2.2%	20.3%	29.3%	.090	
		Total	100.0%	0.0%	100.0%	100.0%	.000	

Occupational Group (last 12 months)			Estimate	Standard Error	95% CI		CV	Unweighted Count
					Lower	Upper		
Non-worker	Population Size	Adult (18 or older)	133,248	12,724	107,390	159,105	.095	766
		Child (5–17)	139,120	11,918	114,900	163,340	.086	823
		Total	272,368	23,348	224,918	319,817	.086	1,589
	% of Total	Adult (18 or older)	48.9%	1.5%	45.9%	51.9%	.030	
		Child (5–17)	51.1%	1.5%	48.1%	54.1%	.029	
		Total	100.0%	0.0%	100.0%	100.0%	.000	

ix. Data Analysis

Data in this report are presented in simple tables, with the analytic variables presented as rows, and the comparison groups as columns. The first rows present both the weighted population estimate (*N*) and the unweighted sample size (*n*). Columns with a sample size of n<30 are flagged (†) as having "insufficient sample" size, and results are omitted (shown as "X"). Results are shown as percentages, averages, or medians. Percentages are always column percentages. The totals are the sum of the entire sample. Note that sometimes totals may not add up to 100 percent. Column totals may not add up because of rounding or when multiple items or multiple-response items are reported in the same table. N and n may not add up to the row total when a group is omitted. The occupational status of four children in the last 7 days could not be determined because of item non-response. These four cases are not included in any of the comparison groups by occupational status, but are included in the totals.

Significant difference tests between groups (columns) are run using normalized weights, to adjust for the impact of weights on standard errors. Significant differences for percentages are tested using the chi-square homogeneity test. In the case of variables with multiple response categories, significant differences between specific cells are located by examining the adjusted standardized residuals (ASRs). Since reporting ASRs for each cell would make tables too cumbersome, significant differences between cells are only mentioned in the analytical text accompanying the tables.

In the case of continuous variables (shown in tables with their median or average values), significance is tested using Analysis of Variance (ANOVA). The *p*-value would refer in this case to the *F* statistic. The standard 95 percent confidence interval is used for all statistical tests. Significant results are flagged at the 95 percent confidence level (*) and at the 99 percent confidence level (**). In the case of multiple group comparisons, significant differences between specific pairs of groups are located by examining post-hoc tests. Since reporting post-hoc tests for each pair of groups would make reporting too cumbersome, the specific group differences driving significant F-tests are only mentioned in the body of the report.

VI. RESULTS

The figures presented in this section summarize the results of the household and children interviews in the survey population. Since different reference periods and informants are used in different subsections, an early clarification is provided to aid interpretation.

- **Reference Period:** The reference period used by default is work in the last 7 days. This reference period determines the composition of the comparison groups, which will be formed on the basis of their occupational status in the last 7 days. There are, however, some sections where work in the last 12 months is used to analyze seasonal variations, including prevalence of sugarcane work (Section VI.a); frequency of sugarcane activities (Section VI.e.ii.1); and seasons, months, days and hours worked (Section VI.e.ii.2). For other subsections, such as the health status of working children (SectionVI.f), work in the last 12 months is used to broaden the sample base of children that can be analyzed, which is otherwise too small.
- **Choice of Informant:** There are several sections of the report where data on children are available from both adult household informants and children interviews. Except in cases where the comparison of both reports is critical, such as the estimation of child labor prevalence in the sugarcane industry (Section VI.a), only one informant is chosen. Given the child non-response rates discussed above, adult household informants are chosen to collect information on children's demographics and education (Sections VI.c and VI.d), except in the cases where variables were only collected from children (e.g., school absence). The selection of adult informants for these sections is done to maintain maximum representativeness despite child-level non-response, and because adults are probably reliable informants on the more general aspects related to children in their households. Adult informants, however, seem to underestimate the involvement of children in work-related activities, or to ignore the details; thus children's reports are chosen to provide information on children's activities, work-related illnesses or injuries, and working conditions (Sections VI.e, VI.f, and VI.g).

a. Estimated Prevalence of Children Working in the Sugarcane Industry

This study estimates that approximately 196,000 persons (age 5 and older) in Paraguay have participated in sugarcane-related activities for at least 1 hour in the previous 12 months. Out of these 196,000, approximately 131,000 were active in sugarcane-related activities in the previous 7 days. Based on the household survey, approximately 28.1 percent of sugarcane industry workers who had worked in the last 7 days were children. Reports from adults indicate that fewer children were working compared to child self reports (36,729 versus 43,850 in the last 7 days).

Possibly because sugarcane cultivation is labor intensive and requires great physical strengths, most child workers in the sugarcane industry are male (81.5 percent in the past week). Approximately half of the working children belong to the older age category (14 to 17 years of age) and are legally allowed to work in Paraguay. This prevalence of older children could also possibly be due to the physical requirement of the tasks. The median age of child workers is 13, based on the sugarcane children's self-reports, and 14 according to adults in the household survey.

Table VI-1. Prevalence Estimates and Demographic Features of Child Workers in the Sugarcane Industry (RQ #1)

	Child Reports[1]		Adult Reports[2]	
	Worked in Past 7 Days	Worked in Past 12 Months	Worked in Past 7 Days	Worked in Past 12 Months
Total Estimated N of Sugarcane Households	-	-	59,271	85,803
Total Estimated N of Sugarcane Workers	-	-	130,557	195,893
Total Estimated N of Child Sugarcane Workers	45,123	63,698	36,729	54,928
Industry Prevalence of Child Workers (%)[3]	-	-	28.1%	28.0%
Sex of Child Sugarcane Workers				
Male	81.5	78.7	81.8	81.6
Female	18.5	21.3	18.2	18.4
Age of Child Sugarcane Workers				
5–8 years	12.7	13.5	6.8	8.7
9–11 years	16.9	18.7	18.2	17.0
12–13 years	24.8	22.7	21.5	18.8
14–17 years	45.6	45.1	53.6	55.4
Median Age	13	13	14	14
Sample Size (n) of Child Sugarcane Workers	213	314	253	360

[1] Source: Paraguay Children Survey (July-August 2011).
[2] Source: Paraguay Household Survey (July-August 2011).
[3] Computed as a) Total Estimated N of Child Sugarcane Workers over b) Total Estimated N of Sugarcane Workers.

b. Attitudes towards Child Work and Education

Nine in 10 heads of household of children working in sugarcane (sugarcane children) and children working in other sectors (other working children) think it is beneficial for children to work. Heads of household (HoHH) of children who don't work have a significantly lower but still high acceptance regarding the benefit of working (83.2 percent). This generally positive attitude towards work may be attributed to the fact that these children work with their families and, by working, they have contributed to the families' economic well-being. Parents or the children's guardians may also feel that working is good for early skill training.

Adult HoHH of sugarcane and other working children think that girls should start working outside their homes from the age of 16.4 and 16.7, respectively, while the age is slightly lower for boys (15.7 for boys in sugarcane work and 16.3 for boys in non-sugarcane work). Compared with the households with working children, HoHH of non-working children think that girls should start working at a slightly older age—around 17.2 years—and around 16.6 years for boys. HoHH of sugarcane children think the children should spend 3.4 hours a day working and doing household chores, while the HoHH of other working children think that children should spend 3.5 hours per day working and doing household chores. HoHH of children who don't work think that children should spend 3.1 hours a day working and doing household chores.

In summary, it seems that there is a relationship between HoHH attitudes and the occupational status of children. HoHH of sugarcane children and other working children have a greater acceptance of child work in general. They think that children should start working at an earlier age and that children should spend more hours on work and household chores than do the HoHH of

non-working children. HoHH also have different attitudes about the roles of boys and girls, with the acceptable age for work being younger in the case of boys. These different attitudes about child work do not extend to education, upon which HoHHs of both working and non-working children share similar attitudes.

Table VI-2. Head of Household Attitudes Towards Child Work and Education

	HoHH Reports	HoHH Reports Matched to Individual Children				
	Total	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	167,978	251,195	36,729	72,810	141,323	
n=	1,002	1,462	253	364	841	
Is it beneficial for children to work? (%)						
Yes	85.5	85.8%	89.4%	89.3%	83.2%	*<0.01***
No	14.5	14.2%	10.6%	10.7%	16.8%	
Ages for Work and Schooling (Average)						
At what age do you think **girls** should start working outside the house?	16.9	16.9	16.4	16.7	17.2	*<0.01***
At what age do you think **boys** should start working outside the house?	16.4	16.4	15.7	16.3	16.6	*<0.01***
Until what age should **girls** stay in school, if money were not an impediment	17.8	17.7	18.1	17.3	17.8	*<0.01***
Until what age should **boys** stay in school, if money were not an impediment?	17.8	17.7	17.8	17.6	17.8	*0.16*
Daily Hours for Work and Schooling (Average)						
How much time do you think children should spend **working and doing household chores** each day?	3.1	3.2	3.4	3.5	3.1	*<0.01***
How much time should children spend **studying and going to school** each day?	5.6	5.6	5.2	5.7	5.7	*<0.01***

Source: Paraguay Household Survey (July-August 2011).

c. Demographic Characteristics of Sugarcane Children and their Households in the Survey Population

This study found that sugarcane is a predominantly male occupation. An ample majority of sugarcane children are male (81.8 percent), and there are more boys in sugarcane work than in other work (82.2 versus 69.2 percent). This large gap in the working children's gender implies that the physical requirements of sugarcane work may create a higher demand for boys than girls. Considering a similar gender gap exists in non-sugarcane work, and given the HoHH attitudes discussed above, we can assume that, culturally, boys are expected to work more than girls in Paraguay.[37]

[37] As noted above, household chores are not included in the definition of work in this study.

Sugarcane children are older than children in the comparison groups. With a median age of 14, more than half of the sugarcane children (53.7 percent) are in the 14 to 17 age group. Other working children are slightly younger than those in sugarcane work, with 46.7 percent in the 14 to 17 age group and a median age of 13. Non-working children are much younger than both working groups, with a median age of 9.

The majority of sugarcane children (82.9 percent) and other working children (73.1 percent) live with both parents. A higher proportion of non-working children have two deceased or absent parents (15.9), compared with sugarcane children (7.9 percent) and other working children (11.2 percent). It is possible that because children in the study population work with their families, children whose parents are not around have fewer opportunities to work.

Households of sugarcane children are slightly larger (6.5 members) than those of children in non-sugarcane work (6.3 members) and of non-working children (5.8 members). They also have significantly more children, with an average of 3.3, 3.2, and 2.8, respectively.

Table VI-3. Socio-Demographic Characteristics of Children in Sugarcane-Producing Areas by Work Status (RQ #2)

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	251,195	36,729	72,810	141,323	
n=	1,462	253	364	841	
Socio-demographic Indicators	**%**	**%**	**%**	**%**	
Sex					
Male	55.1	81.8	69.2	40.9	*<0.01***
Female	44.9	18.2	30.8	59.1	
Age					
5–8 years	27.7	6.9	12.9	40.7	*<0.01***
9–11 years	23.2	18.1	23.8	24.2	
12–13 years	17.2	21.3	16.8	16.3	
14–17 years	31.9	53.7	46.5	18.8	
Median Age	11	14	13	9	*<0.01***
Parental death/absence					
Both parents alive and present	70.7	82.9	73.1	66.4	*<0.01***
Father deceased or absent	2.1	1.9	1.2	2.7	
Mother deceased or absent	12.6	6.9	14.0	13.3	
Two parents deceased or absent	13.3	7.9	11.2	15.9	
Household size					
Average number of household members	6.1	6.5	6.3	5.8	*<0.01***
Average number of children in the household	2.9	3.2	3.1	2.7	*<0.01***

Source: Paraguay Household Survey (July-August 2011)

Most households in the survey population are headed by men, especially those of sugarcane children (93.9 percent). The average age of the HoHHs in this study is approximately 50. Almost three-fourths (72.8 percent) of the HoHHs of sugarcane children are married, a significantly greater proportion than HoHHs of non-working children. Approximately 56–59 percent of all HoHHs have basic education and have attained the second cycle of primary education.[38]

Table VI-4. Head of Household Demographics in Sugarcane-Producing Areas, by Child Work Status (RQ #3)

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	251,195	36,729	72,810	141,323	
n=	1,462	253	364	841	
HoHH Socio-demographic Indicators	**%**	**%**	**%**	**%**	
Sex					
Male	85.5	93.9	81.4	85.6	*<0.01***
Female	14.5	6.1	18.6	14.4	
Age					
18–30 years	4.8	6.1	3.8	5.1	
31–40 years	14.9	10.7	9.4	18.8	*<0.01***
41–50 years	31.4	38.8	37.4	26.3	
Above 50 years	48.9	44.4	49.4	49.8	
Average Age	50.3	49.0	51.5	50.0	*<0.05**
Marital Status					
Single and never married	7.9	2.8	8.9	8.6	
Married	64.5	72.8	66.8	61.2	
Separated	1.9	1.9	0.7	2.5	*<0.01***
Divorced	0.5	0.0	0.2	0.7	
Widowed	6.3	3.8	8.9	5.5	
Cohabiting	19.0	18.8	14.4	21.5	
Educational Attainment					
Never attended	4.5	4.2	8.2	2.7	
Primary—1st cycle	24.6	29.9	24.7	23.1	
Primary—2nd cycle	58.3	56.1	57.6	59.2	*<0.01***
Primary—3rd cycle	6.1	5.1	4.2	7.3	
Secondary	1.8	0.9	0.5	2.8	
Tertiary	1.3	0.0	2.4	1.1	

Source: Paraguay Household Survey (July-August 2011)

Household socioeconomic status, poverty in particular, are usually associated with child work. In the case of Paraguay, Céspedes noted that the poorest households not only had a greater prevalence of child workers, but also that this prevalence had increased between 1998 and 2001 (Céspedes, 2003). However, household socioeconomic status is difficult to capture accurately through surveys. Indicators that are common in the developed world, such as income or expenditures, are usually hard to capture, not appropriate, or unreliable in developing countries.

[38] See page 51 for definitions of the cycles of primary education.

A straightforward, self-reported measure of income (Table VI-5) indicates for example that most households of sugarcane children have enough income so that no one ever goes to sleep hungry (73.6 percent), a greater proportion than among households of other working children or non-working children.

Such explicit measures of socioeconomic well-being are, however, liable to response biases. Households may fear taxation or robbery, or expect future benefits from aid programs targeted at the poor, and may represent themselves as more or less wealthier than they actually are. Expenditures are also notoriously difficult to measure, given that they are highly volatile and incurred by different members of the household and respondents may not accurately know the expenditures of other household members (Rutstein & Johnson, 2004).

ICF Macro, with support from the World Bank, developed the wealth index using household asset data from its Demographic and Health Survey (DHS—conducted in more than 75 countries throughout the developing world, in order to overcome the limitations of expenditure or income-based measures. This methodology uses principal component analysis (PCA), a multivariate data reduction technique, to create a composite wealth factor score out of household asset variables, which are used as indicators of wealth. For the study of households in sugarcane areas in Paraguay, ICF Macro collected data on home ownership; construction materials; source of water; toilet type; and ownership of durable goods, vehicles, and land. These variables were dummy-coded and entered into the PCA. The linear combination that explains the most variation is called the first principal component, which is used as a wealth index: Each household is assigned a score for each asset, and the scores are summed for each household. The sample is then ranked into quintiles ranging from 1(lowest) to 5 (highest), and individuals are ranked according to the score of the household in which they reside.[39] This measure of economic status is more permanent than either income or consumption: Income or consumption (particularly discretionary spending) can be highly volatile depending on both seasonal and random factors or shocks, whereas household assets will be more stable, indicating medium- and long-term wealth. Household assets are also more easily measured; much of the information can be gathered by observation or with simple questions, whereas measuring expenditures or income requires long batteries that may be difficult for many respondents.

Using this wealth index, it is clear that sugarcane children's households are less wealthy than the households of other children. Nearly one in three sugarcane children belong to households in the poorest wealth quintile. Households in the lowest wealth quintile have lower rates of ownership of most assets (Table XI-4, Appendix A), including agricultural land (73 percent vs. 91 percent for the wealthiest households) flush toilets (1 vs. 91 percent), piped water into the dwelling (43 vs. 89 percent) and most appliances such as refrigerators (21 vs. 99 percent) or televisions (56 vs. 100 percent).

[39] For complete methodological details, see Rutstein, S. O., and K. Johnson. 2004. *The DHS Wealth Index. DHS Comparative Reports No. 6.* Calverton, Maryland: ICF Macro Inc.

However, it surprising to see the contradictory results of each measure (sufficient income for food vs. wealth index). One possible explanation is that asset-based wealth represents long-term socioeconomic status, whereas current income for food can be volatile. This phenomenon could be tied to the fact that households with non-working children have a higher percentage of deceased or absent parents, which may have produced a recent economic shock to the household and therefore may have produced acute economic difficulties in the short term.

Table VI-5. Socioeconomic Status of Children's Households (RQ #3)

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	251,195	36,729	72,810	141,323	
n=	1,462	253	364	841	
Socioeconomic Indicators	**%**	**%**	**%**	**%**	
Is the income your household makes sufficient to maintain a household where nobody goes to sleep hungry?					
Yes, nobody ever goes hungry	63.0	73.6	66.4	58.5	
Yes, except during the worst times of the year	18.8	13.0	19.6	19.9	*<0.01***
No, people do go to sleep hungry	18.2	13.4	14.0	21.7	
Wealth Index Quintiles					
1 (Poorest)	22.8	34.7	21.9	20.2	
2	22.6	18.1	24.5	22.8	
3	20.5	20.8	20.3	20.5	*<0.01***
4	18.2	14.4	17.9	19.3	
5 (Wealthiest)	15.9	12.0	15.4	17.2	
Median Wealth Index Score	1.8	-21.4	7.4	5.7	*<0.01***

Source: Paraguay Household Survey (July-August 2011)

d. Education and Child Work

According to article 76 of the 1992 Constitution of Paraguay, primary education is both compulsory and free in public schools. The school system is divided into levels, cycles and grades (Table VI-6). Since the latest reform of the school system, basic or primary education level spans from grade 1 to grade 9, corresponding to ages 6 to 14. Although universal primary education has not yet been achieved in Paraguay, the net primary enrollment rate[40] stands at 85 percent (compared with 91 percent in the United States) and primary completion rates at 93.4 percent (compared with 96.2 percent in the United States).[41,42] However, some education indicators in Paraguay, such as the primary dropout rate (21.9 percent), are still relatively poor by international standards.[43]

[40] Number of children of official primary school age who are enrolled in primary education or higher, as a percentage of the total children of the official school age population.
[41] Percentage of students completing the last year of primary school is calculated by taking the total number of students in the last grade of primary school, minus the number of repeaters in that grade, divided by the total number of children of official graduation age.
[42] World Bank Millennium Development Goals Monitor.
[43] United Nations Education Scientific and Cultural Organization (UNESCO) Institute for Statistics in EdStats.

Table VI-6. Structure of the School System in Paraguay

Level	Cycle	Grades	Corresponding Age
Pre-school	Initial	---	---
Basic (Former Primary + Intermediate levels)	First Cycle	Grades 1–3	6–8 years
	Second Cycle	Grades 4–6	9–11 years
	Third Cycle	Grades 7–9	12–14 years
Medium (Former Secondary level)	Scientific Medium	Grades 10–12	15–17 years
	Technical Medium	Grades 10–12	15–17 years

Working children, usually who already belong to disadvantaged groups, face additional difficulties for obtaining an adequate education. Child work has been linked with decreased school achievement, lower school attendance, higher dropout rates, grade-age delays, etc. Children's work affects the decision households make on whether to send children to school or not; and even for those children who work and attend school, a few hours of work per day can hinder school achievement (Rosati & Rossi, 2001).

This section analyzes the relationship between sugarcane work and education, including school participation, attendance, absenteeism, progress/age-grade delay, and self-reported interference of work with education.

i. School Participation and Attendance of Children in the Survey Population

School participation in the survey population is almost universal. According to household informants, almost all children in the households interviewed have attended school at some point, except for some children in the 14 to 17 year old group, irrespective of occupational groups. There are no significant differences between sugarcane children and other children in terms of school participation, either at the total level, by age or by gender groups.

The situation changes significantly when we examine current school attendance. According to household informants, only three out of four sugarcane children (77.8 percent) are attending school this year; the lowest attendance rate compared to other working children (83.4 percent) and non-working children (94.3 percent). These differences across occupational groups are mostly driven by older children. While nearly all children between 6 and 11 years old are attending school, irrespective of occupational status, sugarcane children 14 to 17 years old have the lowest school attendance rate (61.2 percent), significantly lower than other working children (69.6 percent) and non-working children (81.8 percent) of the same age group. More sugarcane girls are attending school this year, compared with sugarcane boys (82.1 percent vs. 76.8 percent).

Table VI-7. Children's School Attendance in Sugarcane-Producing Areas, by Age and Gender (RQ #4)

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	236,838	36,645	71,735	128,302	
n=	1,380	252	361	765	
Are you attending school this school year? (% "Yes")	**%**	**%**	**%**	**%**	
Total	**88.4**	**77.8**	**83.4**	**94.3**	***<0.01*****
Age					
6–8 years	99.4	100.0	100.0	99.2	*0.79*

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
9–11 years	99.7	100.0	100.0	99.5	*0.70*
12–13 years	90.6	95.7	87.5	90.4	*0.34*
14–17 years	71.6	61.2	69.0	82.7	*<0.01***
Gender					
Male	87.8	76.8	83.9	98.0	*<0.01***
Female	89.2	82.1	82.2	91.8	*<0.01***

Source: Paraguay Household Survey (July-August 2011).
Base: Children who have achieved the age of mandatory attendance in primary school (6 years old or older). Base includes children who have never attended school.

When we look exclusively at the demographic characteristics of children working in sugarcane (Table VI-8), it becomes even more obvious to what extent older children drive attendance rates. Nearly all of the children who are working in the sugarcane industry and not attending school are in the 14 to 17 years age group (95.7 percent), while slightly under half of the children (42.3 percent) working in sugarcane and attending school are in the 14 to 17 years age group. The proportion of girls, on the other hand, does not vary significantly depending on the school attendance status of sugarcane children.

Table VI-8. Demographic Characteristics of Children Working in Sugarcane, by School Attendance Status (RQ #4)

	Total	Children in Working in Sugarcane and Attending School	Children Working in Sugarcane and Not Attending School	*p*-value
N=	36,645	28,507	8,138	
n=	252	194	58	
	%	%	%	
Age				
6–8 years	6.5	8.3	0.0	
9–11 years	18.1	23.2	0.0	*<0.01***
12–13 years	21.4	26.2	4.3	
14–17 years	54.0	42.3	95.7	
Gender				
Male	81.9	81.0	85.4	*0.32*
Female	18.1	19.0	14.6	

Source: Paraguay Household Survey (July-August 2011).
Base: Children who have achieved the age of mandatory attendance in primary school (6 years old or older), worked in the last 7 days in sugarcane-related activities, and are currently attending school.

The reported reasons why children are not going to school in all groups are lack of affordability (38.5 percent), followed by work (33.5 percent), and lack of interest in school (32.9 percent). Interestingly for sugarcane children, work is not the main reason they are not going to school (29.2 percent); having no interest in school was cited as the primary reason (43.8 percent), followed by lack of affordability (31.3 percent). Having no interest in school is mentioned for sugarcane children significantly more often than for other children, which may be the result of age differentials; sugarcane children are older on average and may have no interest in continuing their education beyond the basic level.

Table VI-9. Reasons for Children Not Attending School in Sugarcane-Producing Areas (RQ #5)

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	27,428	8,138	11,981	7,310	
n=	157	58	52	47	
	%	%	%	%	
What is the reason that child is not going to school?					
Cannot afford schooling	38.5	31.3	42.9	39.5	*0.44*
To work	33.5	29.2	45.7	18.6	*<0.01***
Not interested in school	32.9	43.8	37.1	14.0	*<0.01***
Help at home with household tasks	11.8	8.3	15.7	9.3	*0.40*
Disabled/illness	9.3	8.3	4.3	18.6	*<0.05**
No school/school too far	8.8	12.8	5.7	9.3	*0.41*
Family does not promote schooling	1.2	0.0	1.4	2.3	*0.60*
Other	0.6	0.0	0.0	2.3	*0.25*

Source: Paraguay Household Survey (July-August 2011).
Note: Multiple responses; totals may not add up to 100 percent.
Base: Children who have achieved the age of mandatory attendance in primary school (6 years old or older) and are not attending or have never attended school.

ii. School Absence[44]

Among the children who are currently attending school, school absence rates are similar irrespective of occupational status. Almost 9 out of 10 sugarcane children (90.9 percent) reported going to school every day during the last week school was in session. School attendance for children working in non-sugarcane industries of the same age group is much lower (83.7 percent) than for the other occupational groups, although there is no clear explanation for this finding. Other than this, there were no significant differences in the absence rates of different occupational groups, either by age or gender.

Table VI-10. School Absence of Children in Sugarcane-Producing Areas, by Age and Gender (RQ #4)

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	209,429	35,475	63,989	109,965	
n=	964	179	260	525	
"In the last week school was in session, did you go to school every day school was open?" (% "Yes")	%	%	%	%	
Total	**91.8**	**90.9**	**89.6**	**93.1**	***0.10***
Age					
6–8 years	91.5	77.8	92.1	92.0	*0.34*
9–11 years	91.7	96.3	83.3	95.5	*<0.01***
12–13 years	89.2	85.3	96.3	86.6	*0.13*
14–17 years	93.6	94.1	90.1	96.9	*0.15*
Gender					

[44] Data on school absence were only collected directly from children; so the results presented in this section belong to data from the children interviews.

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
Male	89.9	88.2	87.2	92.9	*0.40*
Female	94.4	100.0	96.3	93.5	*0.55*

Source: Paraguay Children Survey (July-August 2011).
Base: Children who have achieved the age of mandatory attendance in primary school (6 years old or older) and are currently attending school.

Table VI-11. Characteristics of School Absence of Children in Sugarcane-Producing Areas (RQ #5)

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	16,373	3,005	7,364	6,005	
n=	71	13†	28†	30	
How many days did you not go to school on the last week the school was in session? (Median)	**2.0**	**X**	**X**	**1.5**	***0.13***
Why did you miss school on these days? (%)					
Illness	37.0	X	X	41.2	*0.37*
Bad weather conditions	27.4	X	X	29.4	*0.93*
Injury/disability	2.7	X	X	5.9	*0.30*
Working but not in family business	2.7	X	X	0.0	*0.20*
School was closed	2.7	X	X	0.0	*0.20*
To help with family business	2.7	X	X	0.0	*0.29*
To help at home with household chores	2.7	X	X	0.0	*0.20*
Other	25.7	X	X	26.5	*0.59*

Source: Paraguay Children Survey (July-August 2011)
Base: Children who have achieved the age of mandatory attendance in primary school (6 years old or older), are currently attending school and did not go to school every day school was open in the last week school was in session.
† Insufficient sample size.

iii. Progress in school

Household informants reported children in sugarcane work having an average 0.7 age-grade delay[45] compared to 0.4 for the children doing non-sugarcane work. Non-working children have no delay at all. Older children in sugarcane work in the 14 to 17 age group experience more than one grade delay (1.2) compared to the younger age groups. Among sugarcane children, boys experience a greater age-grade delay than do sugarcane girls, and also more than other working and non-working boys.

It is possible that sugarcane work may have affected the children's educational progress, although the reverse causal effect is also possible, with children who are less interested in school starting to work in the sugarcane industry at greater rates than children who are more interested in school.

[45] Age-grade delay is calculated as the difference between the grade expected for the child's age and the actual grade the child is attending. This measure is more useful than comparing the grades of different groups of children, as any age differences between groups will complicate the interpretation of the results. In the case of Paraguay, children are expected to enroll in the first grade after they turn 6 years old. Age-grade delay is therefore calculated as (current grade + 6) – current age (only calculated for children currently attending school).

Table VI-12. Average Age-Grade Delay of Children in Sugarcane-Producing Areas, by Age and Gender (RQ #4)

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	209,239	28,507	59,754	120,933	
n=	1,221	194	309	716	
Average Age-Grade Delay (Grades)					
Total	**0.2**	**0.7**	**0.4**	**0.1**	***<0.01*****
Age					
6–8 years	-0.3	-0.3	-0.2	-0.3	*0.80*
9–11 years	0.1	0.4	0.0	0.1	*0.18*
12–13 years	0.4	0.6	0.6	0.2	*0.08*
14–17 years	0.7	1.2	0.7	0.4	*<0.01***
Gender					
Male	0.3	0.9	0.4	0.1	*<0.01***
Female	0.1	0.3	0.3	0.1	*<0.05**

Source: Paraguay Household Survey (July-August 2011)
Base: Children who have achieved the age of mandatory attendance in primary school (6 years old or older) and are currently attending school.

iv. Interference of Work with Education

Overall, 14.3 percent of sugarcane children who are attending school reported that work interferes with their studies, an almost identical percentage as other working children. Moreover, 5.6 percent of sugarcane children reported not having enough time to do their homework and study at home. Only half of the sugarcane children and approximately 60 percent of other working children said they never or almost never miss school, and as many as 13.2 percent reported missing school for work once per week or more times.

Thus it seems clear that sugarcane work interferes with the education of sugarcane children who are attending school, at least according to the children's self-reports. On the other hand, the interference of sugarcane work with education does not seem worse than the interference of other economic activities with education.

Table VI-13. Interference of Work with Education for Working Children in Sugarcane-Producing Areas (RQ #5)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	99,464	35,475	63,989	
n=	439	179	260	
Interference indicators	**%**	**%**	**%**	
Does your work interfere with your studies? (% Yes)	**14.2**	**14.3**	**14.2**	***0.79***
Do you have enough time to do homework and study at home? (% No)	**7.8**	**5.6**	**9.0**	***0.24***
How often do you miss school for work?				
Once per week or more	11.8	13.2	11.1	
Once or twice per month	15.4	17.0	14.5	
Once or twice per month	9.4	11.9	8.0	*0.56*
Never or almost never	58.7	54.1	61.2	
DK/NR	4.7	3.7	5.2	

Source: Paraguay Children Survey (July-August 2011).
Base: Children who have achieved the age of mandatory attendance in primary school (6 years old or older), worked in the last 7 days and are currently attending school.

e. Activities of Children in Sugarcane-Producing Areas

This section presents an overview of children's activities in the survey population, including non-economic activities (household chores), economic activities (work), and the characteristics of these activities, with a focus on sugarcane-related activities. Other activities of non-economic nature that children may perform (e.g., leisure activities or rest) are not discussed in this report.

i. Household Chores

Children often spend a significant amount of their time doing household chores. These activities, while not economic in nature, can represent a significant burden for the child and add on to the negative impact of work on children's welfare opportunities. More specifically, ignoring household chores may underestimate the impact on girls in particular, who tend to be responsible for a disproportionately large share of domestic activities. This section analyses the types of household chores that children usually perform and the time devoted to them, with a focus on differences, by occupational group and gender.

1. Activities Performed

Household chores are often defined as "domestic or personal services provided by unpaid members of the household" (ILO, 2004, p. 35), activities that fall outside the System of National Accounts (SNA) boundaries. Household chores, as defined in this report, include—

- Housekeeping activities, such as cleaning, shopping, washing clothes, preparing and serving meals, washing dishes, fetching water and firewood;
- Caring for children, sick, or old people in the own home; and
- Making small repairs in one's own house.

Most children working in the sugarcane industry perform one or more of these activities for at least 1 hour on a given week, with only 3.3 percent not doing any household chores. Sugarcane children are not different in this regard from children in other occupations or non-working children, who also reported doing one or more household chore in a similar proportion. Cleaning the house is the chore that a greater proportion of children performed in the last week, with about four in five children in all groups reporting so, followed by collecting firewood, shopping and cooking, serving meals, and washing dishes (Table VI-14). There are, however, significant differences regarding which chores are performed more often by each group of children. Sugarcane children are involved in heavy-duty chores, such as collecting firewood (69 percent) and water (47 percent), to a greater extent than are non-working children (51.3 and 21.4 percent respectively). Sugarcane children also reported caring for children, sick or old household members more often than did non-working children (27.3 vs. 21.5 percent). This pattern is similar for children working in other sectors, suggesting that these activities, which require greater responsibility or strength, are carried out by older children and/or boys, which are over-represented in the working children groups. Washing clothes is the only activity that sugarcane children report less often than non-working children (32.7 percent vs. 45.6).

Table VI-14. Household Chores Done in the Last Week in Sugarcane-Producing Areas

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	*p*-value
N=	251,144	45,123	75,885	129,931	
n=	1,136	213	299	623	
	%	%	%	%	
Since last (day of the week), did you do any of the following things? (% "Yes")					
Cleaning the house	83.7	78.2	84.3	85.3	*0.13*
Collecting firewood	60.2	69.0	70.0	51.3	*<0.01***
Shopping for household	56.9	50.8	61.7	56.1	*<0.05**
Cooking for family, serve meals, wash dishes	55.1	51.5	53.4	57.4	*0.25*
Washing clothes	42.3	32.7	42.2	45.6	*<0.01***
Minor household repairs	38.2	40.9	42.3	34.9	*0.06*
Collecting water	29.3	47.0	32.2	21.4	*<0.01***
Caring for children/old/sick	24.9	27.3	29.4	21.5	*<0.05**
Other	4.0	6.0	2.8	4.1	*0.23*
DK/NR	0.6	0.0	0.0	1.1	*0.13*
None	5.3	6.3	3.3	6.1	*0.12*

Source: Paraguay Children Survey (July-August 2011)
Note: Multiple items; totals may not add up to 100 percent.

There are clear differences by gender, both in terms of children's overall involvement in household chores and their involvement in specific activities. Virtually all sugarcane girls (99.8 percent) reported doing one chore or more in the last week, whereas 7.7 percent of boys in this group did none. Despite this overall imbalance, there are clearly male and female chores. More sugarcane boys than girls are involved in collecting firewood (71.2 vs. 59.2 percent), while more girls are involved in the remaining tasks. Cleaning the house (98.1 percent) and cooking, serving meals and washing dished (88.7 percent) are the activities that occupied a greater proportion of sugarcane girls in the last week.

Table VI-15. Household Chores Done in the Last Week in Sugarcane-Producing Areas, by Gender

	Total		Children Working in Sugarcane		Children in Other Work		Non-Working Children		*p*-value
	Male	Female	Male	Female	Male	Female	Male	Female	
N=	136,257	114,888	36,789	8,334	50,772	25,114	48,491	81,440	
n=	574	562	162	51	174	125	237	386	
	%	%	%	%	%	%	%	%	
Since last (day of the week), did you do any of the following things? (% "Yes")									
Cleaning the house	75.2	93.9	73.7	98.1	78.4	96.1	72.9	92.7	*<0.01***
Collecting firewood	66.4	52.6	71.2	59.2	74.7	60.5	54.4	49.5	*<0.01***
Shopping for household	53.3	60.9	46.4	70.2	58.4	68.4	53.5	57.7	*<0.01***
Cooking for family, serve meals, wash dishes	34.8	79.3	43.0	88.7	36.2	88.1	26.8	75.6	*<0.01***
Washing clothes	22.6	65.7	25.1	66.1	25.9	75.1	16.9	62.8	*<0.01***
Minor household repairs	35.4	41.7	39.6	47.0	40.1	46.6	27.1	39.6	*<0.01***
Collecting water	31.4	26.7	45.4	54.5	29.8	37.2	22.7	20.7	*<0.01***
Caring for children/old/sick	21.8	28.6	24.0	41.8	27.1	34.1	14.7	25.6	*<0.01***
Other	5.1	2.7	6.6	3.0	3.4	1.4	5.8	3.1	*0.17*
None	8.2	1.9	7.7	0.2	4.8	0.3	12.2	2.6	*<0.01***
DK/NR	0.1	1.1	0.0	0.0	0.0	0.0	0.4	1.5	*0.06*

Source: Paraguay Children Survey (July-August 2011)
Note: Multiple items; totals may not add up to 100 percent.

2. Time Spent on Household Chores

The distinction between work and chores is mostly a technicality derived from the UN system of national accounts, which is subject to an ongoing debate. Performing household chores can have the same effect as work, jeopardizing children's health or their ability to perform adequately in other areas, most importantly school. There is no clear evidence regarding the health effects of household chores on children (Francavilla & Lyon, 2003), but there is sufficient proof of a link between time spent on household chores and school performance (Hazarika & Bedi, 2003; Assaad, Levison & Zibani, 2010). Analyzing the time children spend on household chores is therefore necessary to establish the overall impact of economic and non-economic activities on children's welfare opportunities.

Children working in sugarcane perform chores 5.2 days per week on average, a similar number of days as children working in other sectors or non-working children. While measuring the number of days is rather straightforward, measuring the actual number of hours spent per week may be more liable to recall and measurement error. This study measured the hours spent on chores using two different methods. In the first method, children were asked for a global computation of the number of hours they typically spend on chores during school days and non-school days. As Table VI-15 shows, this distinction is relevant, since children spend more time on chores on the days that they don't go to school. By this measure, sugarcane children spend on average 2 hours and 12 minutes on the days they go to school, and 3 hours and 14 minutes on the days they don't go to school. Again, these times are similar to other groups of children, although children working in other sectors appear to spend more time on chores than do sugarcane children on the days they don't go to school.

The second method used was to ask children whether they did household chores the day before (referred to as "yesterday"), and if so, at what time they started and finished in the morning, afternoon, and evening.[46] This method was designed to aid recall and boost the reliability of the children's self-reports, using *yesterday* as a generally representative reference period equivalent to "any given day." Using this method, children working in sugarcane reported spending 3 hours and 1 minute on average on household chores, which appears to be slightly higher than the comparison groups. Using this latter estimate of number of hours per day and the estimated number of days per week, we can estimate that sugarcane children spend on average a total of 17 hours and 10 minutes per week on household chores, which is statistically not different from the time spent by children working in other sectors or non-working.

Table VI-16. Days and Hours Spent on Chores in Sugarcane-Producing Areas

	Total	Children Working in Sugarcane	Children in Other Work	Non-Working Children	
N=	236,379	42,269	73,375	120,531	
n=	1,073	204	289	579	*p*-value
Average Values					
Number of days spent doing chores in last 7 days	5.3	5.2	5.6	5.3	*<0.05**
Number of hours spent doing chores on days child goes to school	2:17	2:12	2:27	2:13	*0.11*
Number of hours spent doing chores on days child does not go to school	3:22	3:14	3:38	3:15	*<0.05**
Number of hours spent doing chores yesterday[1]	2:44	3:01	2:54	2:32	*0.05*
Estimated hours spent on chores per week[1]	16:22	17:10	17:34	15:21	*0.18*

Source: Paraguay Children Survey (July-August 2011).
Base: Children who did at least one chore in the last 7 days.
[1] Base: Children who did chores yesterday.

Again, there are significant differences on the time that girls and boys spend on chores. On average, sugarcane girls are engaged in household chores more days of the week than boys (6.2 vs. 4.9). No matter what method we use, sugarcane girls also reported spending significantly more time on household chores than did sugarcane boys per day, either on the days they go to school (2:58 vs. 2:02), on the days they don't go to school (4:31 vs. 2:55), or *yesterday* (4:03 vs. 2:30). All in all, it is estimated that sugarcane girls spend on average 27 hours and 45 minutes on household chores per week, nearly twice as much as sugarcane boys. Not only do sugarcane girls spend more time on chores than boys, they also appear to spend significantly more time on chores than non-working girls, which spent on average 17 hours and 36 minutes.

[46] In the Spanish-speaking world, the day is typically divided in three main periods ("*mañana*," "*tarde*," and "*noche*") that cover the 24 hours. These divisions, which roughly correspond with the English "morning," "afternoon," and "evening" were the ones used in the questionnaires to probe the time spent on chores and work. Children who couldn't recall the exact times were asked whether they spent "a little," "some," or "all" of each period doing chores. For computation purposes, these responses were respectively imputed the 25th, 50th, and 75th percentile of the times reported by the children who could recall exact times.

Table VI-17. Household Chores Done in the Last Week in Sugarcane-Producing Areas, by Gender

	Total		Children Working in Sugarcane		Children in Other Work		Non-Working Children		*p*-value
	Male	Female	Male	Female	Male	Female	Male	Female	
N=	124,876	111,504	33,953	8,316	48,327	25,048	42,391	78,140	
n=	525	548	154	50	165	124	205	374	
Average Values									
Number of days spent on chores since last week	5.0	5.8	4.9	6.2	5.2	6.2	4.7	5.6	*<0.01***
Number of hours spent on chores on days child goes to school	02:05	02:32	02:02	02:58	02:07	03:11	02:04	02:18	*<0.01*
Number of hours spent on chores on days child does not go to school	02:59	03:48	02:55	04:31	03:03	04:51	02:58	03:22	*<0.01*
Number of hours spent on chores yesterday[1]	02:11	03:10	02:30	04:03	02:14	03:59	01:55	02:48	*<0.01***
Estimated hours spent on chores per week[1]	12:11	20:28	13:57	27:45	12:21	26:26	10:32	17:36	*<0.01***

Source: Paraguay Children Survey (July-August 2011).
[1] Base: Children who did chores yesterday.

In summary, household chores appear to represent a significant burden for sugarcane children. Sugarcane children spend as much time on household chores as children working in other sectors or non-working children, and have a greater involvement than non-working children on heavy-duty chores such as collecting firewood or water. Sugarcane girls in particular bear the greatest load, spending nearly twice as many hours doing chores as do sugarcane boys. Therefore, this burden must be taken into account when analyzing the effect of working hours on the children's welfare opportunities, both at overall and by gender.

ii. Working Conditions of Children in the Sugarcane Industry

This section analyzes the characteristics of the sugarcane-related activities performed by children in Paraguay, including tasks performed, working seasons, days and hours, work locations, earnings, and the presence of hazardous working agents and processes.

In this section, the currently active population is analyzed (those who worked for at least 1 hour in the previous 7 days) to facilitate respondent's recollection of detailed questions about working conditions, except in the case of tasks performed and working seasons, days and hours, where the 12-month reference period is used to obtain a measure of frequent vs. overall tasks, the total time spent working during the year and seasonal work flows. This type of analysis is particularly relevant in agriculture-related activities, as seasonality in this sector is often pronounced.

1. Tasks Performed

Children who were currently active (last 7 days) at the time of the survey were primarily involved in activities directly related to the harvesting process, including peeling sugarcane leaves (79.4 percent), cutting down sugarcane (67.2 percent) and manually loading the sugarcane cart (56.4 percent). Although fewer girls participate in sugarcane-related activities, those that do participate carry out much the same tasks as boys, except in the case of cutting down sugarcane, a physically demanding activity, where the participation of girls is lower (44.7 percent vs. 72.3 percent in the case of sugarcane boys).

Children who participated in sugarcane-related activities at some point in the last 12 months were also primarily involved in harvest-related activities such as peeling sugarcane leaves (84.6 percent), cutting down sugarcane (74.0 percent) and manually loading the sugarcane cart (51.9 percent), although a large proportion also reported working on planting-related tasks, including cleaning, weeding or burning weed from the land (44.7 percent) and sowing sugarcane (34.4 percent). There are significant differences between which tasks are performed by girls and boys during a year, with boys being more likely than girls to work on cleaning/weeding/burning weed from the land (44.7 vs. 21.3 percent), fertilizing the sugarcane fields (36.6 vs. 26.2 percent), cutting down sugarcane (74.0 vs. 34.4 percent) and manually loading the sugarcane cart (55.8 vs. 37.7 percent). Besides gender, there are significant differences in the tasks done by children of different ages, with a significantly greater participation of older children (age 14 to 17) in nearly all the activities (Table VI-18).

The degree of participation in different tasks is an important variable in this sector, as each activity entails different levels of exposure to hazards. Cutting down sugarcane, for example, involves strenuous work with sharp machetes for long hours, under sometimes extreme heat. Sowing sugarcane, on the other hand, can be tiring, as it is done by hand, one stem at a time, but it otherwise appears to be a relatively safe activity. The type of activity performed does not appear to show a clear relationship with injury status, as shown in Table XI-7 (Appendix A). The distribution of children by activity appears to be similar, irrespective of whether or not they were injured at work. A more in-depth analysis of work-related injuries is in any case presented in Appendix A.

Table VI-18. Sugarcane-related Activities Performed by Children in the Last 7 Days and Last 12 Months, by Gender

	Last 7 Days[1]				Last 12 Months[2]			
	Total	Male	Female	*p*-value	Total	Male	Female	*p*-value
N=	45,123	36,789	8,334		63,698	50,102	13,597	
n=	213	162	51		314	222	92	
Sugarcane-related Activities	%	%	%		%	%	%	
Cleaning/weeding/burning weed from the land	15.6	17.4	7.9	0.15	39.6	44.5	21.3	<0.01**
Working in the sowing of sugarcane (s.c.)	17.2	16.2	21.6	0.43	34.4	36.6	26.2	0.09
Fertilizing the s.c. fields	10.2	9.6	13.2	0.51	25.3	28.2	14.8	<0.05*
Fumigating s.c.	7.3	6.6	10.5	0.40	11.1	12.3	6.6	0.44
Burning the s.c. fields before the harvest	6.9	7.2	5.3	0.67	9.7	10.6	6.6	0.64
Cutting down s.c.	67.2	72.3	44.7	<0.01**	65.6	74.0	34.4	<0.01**
Peeling s.c. leaves	79.4	80.7	73.7	0.33	83.7	84.6	80.3	0.43
Manually loading s.c. cart	56.4	59.0	44.7	0.11	51.9	55.8	37.7	<0.05*
Weighting and/or loading s.c. with a winch	2.9	3.6	0.0	0.24	5.6	7.1	0.0	0.10
Driving a tractor for s.c. work	4.9	5.4	2.6	0.48	4.2	4.4	3.2	0.92
Transporting s.c. to the factory with cart/truck	7.4	8.4	2.7	0.23	8.3	10.1	1.6	0.10
Other s.c. related activities	6.3	5.4	10.5	0.24	5.9	5.3	8.2	0.40

Source: Paraguay Children Survey (July-August 2011)
Note: Multiple items; totals may not add up to 100 percent.
[1] Base: Children who performed at least one sugarcane-related activity in the last 7 days.
[2] Base: Children who performed at least one sugarcane-related activity in the last 12 months.

2. Working Seasons, Days and Hours

The amount of time a child spends working has a direct bearing on the likelihood that the child will experience a work related injury or illness, lower school attendance and poorer educational achievement (Rosati & Rossi, 2001; ILO Convention on the Worst Forms of Child Labour, 1999 (ILO 182), and its corresponding Recommendation No. 190 single out work under particularly difficult conditions such as work for long hours or work at night as hazardous labor. Obtaining an adequate measure of the amount of time a child spends working is therefore critical to determine whether she or he is involved in hazardous work. This section analyzes the number of months, weeks, days, and hours children spend on their main occupation[47] to determine the extent of children's involvement throughout the year and whether children work excessive hours.

Children for whom sugarcane is their main occupation (hereafter "sugarcane children") work on average 8.4 months per year on sugarcane-related activities, and 3.3 weeks during a typical month. As we have seen in Section VI.e.ii.1, sugarcane children are primarily involved in harvest-related activities. While sugarcane can be harvested throughout the year, depending on the maturity of the canes, the harvest season peaks around the austral winter months, between May and August (ICF Macro, 2011), which are indeed the months when most sugarcane children report to be working. June represents the absolute peak, with 82.2 percent of sugarcane children working, followed by July (73.7 percent). Although school is in session in Paraguay during these months, there is a midyear school vacation period lasting approximately 15 days in early July, which is a time when many children work most (ICF Macro, 2011). Besides harvesting, work in other sugarcane-related activities occurs throughout the year, although sugarcane work appears to be slightly more seasonal than the activities of other working children in the survey population, particularly in January, when only 56.9 percent of sugarcane children work, compared with 68.9 percent of children working in other activities.

Similarly to the estimation of hours spent on household chores, several methodologies were used to estimate the number of hours children work for increased reliability. In the first method, children were asked for a global computation of the number of hours they work on a "typical" work day. By this measure, sugarcane children work on average 4 hours and 59 minutes per day, significantly more than the time spent by children working in other activities (4:16). Using the estimated number of typical hours per day and the estimated number of typical days per week, we can estimate that sugarcane children typically work on average 26 hours and 1 minute per week, nearly 5 hours more than children working in other sectors.

In the second method, children were asked for a global computation of the number of hours they typically work during school days and non-school days. As in the case of household chores, this distinction is relevant, since children spend more time working on days that they don't go to school (Table VI-19). By this measure, sugarcane children work on average 3 hours and 34 minutes on days they go to school, and 6 hours and 6 minutes on days they don't go to school. Again, these times are greater than children working in other activities.

[47] Note that questions in the remaining of Section VI. are always referred to the main occupation, and so child comparison groups are determined by the main activity performed by the child. This means that the group sizes are slightly different from previous sections.

Table VI-19. Months, Weeks, Days, and Hours Worked by Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months (RQ #9)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	120,162	47,648	72,514	
n=	503	230	273	
	%	%	%	
Did you work on…				
January	64.2	56.9	68.9	*<0.01***
February	64.7	60.1	67.8	*0.11*
March	64.3	60.4	66.9	*0.19*
April	66.7	65.2	67.7	*0.64*
May	69.5	69.4	69.6	*0.92*
June	82.6	82.2	82.8	*0.98*
July	73.3	73.7	73.0	*0.62*
August	68.2	67.4	68.8	*0.84*
September	62.8	65.1	61.2	*0.30*
October	64.6	64.7	64.5	*0.88*
November	59.5	57.0	61.1	*0.40*
December	63.7	60.8	65.7	*0.29*
Average number of months worked	8.6	8.4	8.7	*0.45*
Average number of weeks worked in a typical month	3.3	3.3	3.2	*0.30*
Average number of days worked in a typical week	4.8	5.1	4.7	*<0.01***
Average number of hours worked in a typical day	4:33	4:59	4:16	*<0.01***
Average number of hours worked in a typical week	23:04	26:01	21:05	*<0.01***
Average number of hours worked on days child goes to school	3:04	3:34	2:47	*<0.01***
Average number of hours worked on days child does not go to school	5:20	6:06	4:49	*<0.01***

Source: Paraguay Children Survey (July-August 2011)
Note: Multiple response items; totals may not add up to 100 percent.
Base: Children who worked in the last 12 months and could describe their main activity.

The third method used consisted of asking currently active children (working in the last 7 days) what time they started and finished working in the morning, afternoon and evening on the last day that they had worked. This method was designed to aid recall and boost the reliability of children's self-reports, using the last day they had worked as a generally representative reference period equivalent to "any given day." Using this method, the children working in sugarcane are estimated to work on average 4 hours and 39 minutes per day, which again is significantly more than children in other occupations.

Finally, in order to arrive at a weekly estimate of hours for currently active children, we turn to the number of days these children worked in the last week. Most sugarcane children work between Monday and Saturday, with only 3.9 percent working on Sunday. Sugarcane children reported having worked on average 4.7 days in the last week. Using the estimated number of hours per day and the estimated number of days per week, we can estimate that children working in sugarcane work on average 22 hours and 25 minutes per week, nearly 5 hours more than children working in other sectors.

It is worth noting that although estimates obtained from different measures are not identical (asking for "typical" working days and hours appears to obtain a higher estimate), we can conclude that sugarcane children work on average of 22 to 26 hours per week. Comparisons with children working in other sectors are sufficiently consistent to conclude that sugarcane children work approximately 5 more hours per week than do children in other sectors.

Table VI-20. Days and Hours Worked by Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days (RQ #9)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
	%	%	%	
Last week, did you work on…				
Monday	78.0	76.5	78.8	*0.60*
Tuesday	74.7	82.4	70.6	*<0.01***
Wednesday	73.8	81.2	69.9	*<0.05**
Thursday	74.9	78.2	73.1	*0.27*
Friday	78.2	85.7	74.1	*<0.01***
Saturday	55.2	63.0	51.0	*<0.05**
Sunday	9.3	3.9	12.2	*<0.01***
Average number of days worked in the last week	4.4	4.7	4.3	*<0.05**
Average number of hours worked in the last day	4:05	4:39	3:47	*<0.01***
Average number of hours worked per week	18:56	22:25	17:05	*<0.01***

Source: Paraguay Children Survey (July-August 2011)
Note: Multiple response items; totals may not add up to 100 percent.
Base: Children who worked in the last 7 days and could describe their main activity.

3. Work Locations

Most children working in the sugarcane industry work on family farms (59.5), although to a lesser extent than children in other occupations (78.9 percent). Sugarcane children, on the other hand, work on third party farms more often than do children in other work (34.8 percent vs. 5.3 percent). Overall, 2.5 percent of sugarcane children said they carried out their main work on the street, compared with 4.9 percent of non-sugarcane children. This small group of sugarcane children may be engaged in transporting sugarcane, thus citing the street as their main place of work.

Table VI-21. Work Locations of Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
Work Location	%	%	%	

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
Where do you carry out your main work?				
Family farm	72.6	59.5	78.9	*<0.01***
Third-party farm	15.4	34.8	5.3	
Family dwelling	1.7	0.6	2.3	
Employer's house	3.7	1.9	4.6	
Formal office	0.0	0.0	0.0	
Factory	0.2	0.0	0.3	
Shop/market/kiosk	0.4	0.0	0.7	
In village	1.1	0.6	1.3	
Different places (mobile)	0.4	0.0	0.7	
On the street	4.1	2.5	4.9	
Other	0.4	0.0	0.7	
DK/NR	0.2	0.0	0.3	

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 7 days and could describe their main activity.

4. Earnings from Work

a. Form and Amount of Earnings

Most sugarcane children are paid for their work, with only 26.1 percent reporting that they did not receive any type of compensation. The proportion of sugarcane children who are paid is also greater than for children in other work, half of whom (54.9 percent) do not get paid. A majority of sugarcane children (66.8 percent) reported getting paid in cash, again a greater proportion than children who do other work (38.7 percent). Sugarcane children typically get paid weekly (56.4 percent), and they receive a median weekly compensation of approximately 51,179 Guaraníes (approximately 13 USD). Some sugarcane children also report being paid daily (27.4 percent). The weekly payment system is typically associated with the sugarcane harvest season, when children and their families are paid by the number of tons of sugarcane harvested in a week; children may receive a fixed daily rate to perform maintenance tasks such as cleaning/weeding the land and fertilizing the soil.

Qualitative observations conducted during fieldwork and earlier exploratory research (ICF Macro, 2001) suggest that children start getting paid for their work gradually, as they make the transition from family-based work into adulthood and into the labor system of the sugarcane supply chain. Younger children (8 to 10 years old) typically do not receive "a pay" for the services they provide to their parents/family by helping them with their sugar harvest activities. They start accompanying their parents and, at a certain moment, variable from family to family, they start receiving some pocket money for their help (between 2.000 to 20,000 Guaraníes per week, or 50 cents to 5 USD). As children grow older they gradually increase the compensation they receive from their parents for doing tasks such as peeling sugarcane leaves; when they reach 14 to 17 years old and start cutting down cane, they start to be paid on a piece-rate basis, approximately 15,000 to 20,000 Guaraníes (4 to 5 USD) per metric ton produced. It is also by this age that some children may start working independently from their families and selling their labor, as adults, to harvest crops in other people's land.

Table VI-22. Earnings of Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days (RQ #10)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
	%	%	%	
What do you get in exchange for your work?[1]				
Cash	48.4	66.8	38.7	*<0.01***
In kind	1.3	2.8	0.6	*0.09*
New skill	1.5	1.1	1.7	*0.74*
Education	4.8	6.0	4.1	*0.27*
Shelter	1.7	0.2	2.5	*<0.05**
Food	3.2	3.2	3.2	*0.93*
Clothing	5.2	7.0	4.3	*0.23*
Medical support	1.5	2.3	1.2	*0.21*
Not paid	45.0	26.1	54.9	*<0.01***
DK/NR	0.7	0.3	0.9	*0.21*
How is your pay determined?[2]				
Piece rate	3.2	2.6	3.7	
Hourly	0.8	1.7	0.0	
Daily	32.3	27.4	36.6	
Weekly	45.0	56.4	35.1	*<0.01***
Monthly	4.4	0.9	7.5	
Other	6.8	2.6	10.4	
DK/NR	7.6	8.5	6.7	
Median Weekly Earnings (In Guaraníes)[3]	**25,000**	**51,179**	**20,000**	**0.32**

Source: Paraguay Children Survey (July-August 2011).
[1] Base: Children who worked in the last 7 days and could describe their main activity.
[2] Base: Children who worked in the last 7 days, could describe their main activity, and are getting paid.
[3] Base: Children who worked in the last 7 days, could describe their main activity, and are getting paid in cash or in kind.
Note: Multiple response items; totals may not add up to 100 percent.

b. Recipient of payment

Many more children working in the sugarcane industry (22 percent) reported someone else getting paid on their behalf, compared with children in other occupations (8.9 percent). Among those who reported that someone else gets paid on their behalf, more than half of the sugarcane children (57.6 percent) and non-sugarcane children (51.9 percent) cited their fathers. Other recipients of the children's payments include mothers (12.1 percent for sugarcane children and 18.5 percent for non-sugarcane children) and other relatives (9.1 percent for sugarcane children and 3.7 percent for non-sugarcane children).

Table VI-23. Recipient of Payment for Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days (RQ #10)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
	%	%	%	
Is someone else paid in your behalf (%Yes)[1]	**13.4**	**22.0**	**8.9**	***<0.01*****
Who receives payment for your work?[2]				
Mother	15.0	12.1	18.5	
Father	55.0	57.6	51.9	
Other relatives	6.7	9.1	3.7	*0.67*
Other	1.7	0.0	3.7	
DK/NR	21.7	21.2	22.2	

Source: Paraguay Children Survey (July-August 2011)
[1] Base: Children who worked in the last 7 days and could describe their main activity.
[2] Base: Children who worked in the last 7 days, could describe their main activity, and someone else receives money on their behalf.

5. Estimated Prevalence of Children in Hazardous Labor

Sugarcane children are in general not spontaneously aware of the risks they face at work. Only 32.5 percent considered that their work is dangerous. Spontaneous awareness is, however, higher than for children in other work (18.5 percent). This study was designed based on the earlier exploratory research (ICF Macro, 2011), with this low spontaneous awareness in mind; children were asked about risk at work using both spontaneous and prompted questions. Exposure rates increased significantly when children were prompted. For example, only 27.8 percent of sugarcane children spontaneously reported that they were at risk of suffering cuts at work. The number jumped to 80.9 percent when children were prompted.

Although the percentage mentioning each hazard varies depending on the methodology, the top hazards are consistent. Besides cuts, the main hazards reported by sugarcane children were extreme heat (15.9 percent spontaneous and 66.6 percent prompted), snakes (23 percent spontaneous and 61.5 percent prompted), insects (18.4 percent spontaneous and 45.2 percent prompted), extreme cold (14.5 percent spontaneous and 48.3 percent prompted) and prolonged exposure to the sun (8.9 percent spontaneous and 42.8 percent prompted). Although some workplace hazards are common to other working children, there are some hazards that appear to be particularly frequent in the sugarcane industry, most notably cuts, extreme heat, snakes, insects, extreme cold, prolonged exposure to the sun, carrying heavy loads, and having something fall upon the child.

Table VI-24. Exposure to Workplace Hazards for Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days (RQ #7)

	Spontaneous				Prompted			
	Total	Children Working in Sugarcane	Children in Other Work	*p*-value	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099		102,388	35,289	67,099	
n=	422	170	252		422	170	252	
Workplace Hazards	%	%	%		%	%	%	
Chemical Hazards								
Dust/smoke	3.7	8.0	1.4	*<0.01***	25.0	28.2	23.4	*0.23*
Pesticides/insecticides/poison	2.0	4.0	0.9	*<0.05**	9.4	13.0	7.6	*0.05*
Chemical fertilizers	0.5	1.6	0.0	*0.05*	6.9	9.3	5.7	*0.13*
Other Chemical Hazard	-	-	-	-	1.3	3.2	0.3	*<0.05**
Physical Hazards								
Extreme heat	6.8	15.9	2.0	*<0.01***	47.0	66.6	36.6	*<0.01***
Extreme cold	6.3	14.5	2.0	*<0.01***	33.1	48.3	25.1	*<0.01***
Prolonged exposure to the sun	4.4	8.9	2.0	*<0.01***	32.7	42.8	27.3	*<0.01***
Getting burned with fire	1.2	1.6	0.9	*0.42*	7.6	8.2	7.2	*0.72*
Slipping, tripping or falling	6.8	8.0	6.1	*0.45*	29.5	29.6	29.4	*0.94*
Cuts	20.1	27.8	16.1	*<0.01***	62.5	80.9	52.7	*<0.01***
Something can fall upon you	3.1	7.1	0.9	*<0.01***	8.7	15.2	5.3	*<0.01***
You have to carry heavy loads	2.7	5.6	1.1	*<0.01***	28.5	39.5	22.6	*<0.01***
Other physical hazard	-	-	-	-	0.9	2.0	0.3	*0.09*
Biological Hazards								
Insects	11.9	18.4	8.5	*<0.01***	35.6	45.2	30.5	*<0.01***
Snakes	14.8	23.0	10.5	*<0.01***	43.8	61.5	34.5	*<0.01***
Contaminated water	0.2	0.0	0.3	*0.47*	2.9	4.0	2.3	*0.36*
Other biological hazard	-	-	-	-	1.3	0.8	1.5	*0.36*

Source: Paraguay Children Survey (July-August 2011).
Note: Multiple response items; totals may not add up to 100 percent.
Base: Children who worked in the last 7 days and could describe their main activity.

Besides the hazardous agents mentioned above, sugarcane children face several other processes and conditions at work considered to be hazardous according to ILO Convention 182 and Recommendation 190. About half of sugarcane children are working long hours for their age, although the exact figure varies slightly depending on whether we refer to a "typical week" (51.9 percent) or "last week" (46.9 percent, see Section VI.e.ii.2 for methodological details). Irrespective of the measure used, it is worth noting that the proportion of sugarcane children working long hours is significantly lower than among children in other occupations. Additionally, more sugarcane children reported working underground (13 percent) compared with the non-sugarcane children (4.7 percent). This underground work probably refers to work in ditches that appear naturally in the fields as a consequence of deforestation and heavy rains (Ayala et al., 2005).

Table VI-25. Exposure to Hazardous Working Conditions by Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days (RQ #7)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
% Working in Hazardous Conditions	**%**	**%**	**%**	
Work underground	7.6	13.0	4.7	*<0.05**
Work in confined spaces	3.4	2.3	4.0	*0.42*
Workplace too dark	1.2	1.1	1.3	*0.95*
Work at dangerous heights	1.7	1.6	1.7	*0.74*
Work underwater	0.0	0.0	0.0	-
Work at night[1]	0.4	0.0	0.7	*0.41*
Work for long hours (typical week)[2]	57.9	51.9	61.1	*<0.01***
Work for long hours (last week)[2]	53.6	46.3	57.4	*<0.01***

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 7 days and could describe their main activity.
Note: Multiple response items; totals may not add up to 100 percent.
[1] Includes work between 20:00 and 06:00, based on Article 58 of the Paraguay Child and Adolescence Code.
[2] Includes work for any amount of time for children below 12, more than 24 hours per week for children 12 to 14 and more than 36 hours for children 15 to 17, based on Article 123 of the Paraguayan Labor Code.

A vast majority of sugarcane children (97.5 percent), report using some type of dangerous tool, such as machetes (91.9 percent), smaller machetes or *machetillos* (85.8 percent), knives (48.3 percent), and axes (45.9 percent). Although other working children use similar tools, the overall proportion using dangerous tools is significantly lower (89.7 percent). There are several dangerous tools that appear to be more frequent in sugarcane related work than in other work, including machetes, *machetillos*, axes, horse-carts, carts, picks, and cranes/winches. This latter type of machinery is nearly exclusive to sugarcane work and is used to weight and load the bundles of sugarcane onto the trucks. Although many of these cranes/winches are artisanal and can be rickety and prone to accidents, they are relatively rare.

Table VI-26. Use of Tools by Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days (RQ #7)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
Tools	**%**	**%**	**%**	
Do you use _____ in your work?				
Machete*	84.4	91.9	80.4	*<0.01***
Hoe	71.5	71.7	71.4	*0.94*
*Machetillo**	65.6	85.8	55.0	*<0.01***
Shovel	53.9	50.7	55.6	*0.31*
Rake	52.0	45.9	55.2	*0.06*
Knife*	41.8	48.3	38.5	*0.06*
Axe*	38.6	45.9	34.8	*<0.05**
Wheel-barrow	34.2	35.4	33.6	*0.66*
Horse-cart*	30.3	43.1	23.5	*<0.01***
Cart	17.4	26.4	12.7	*<0.01***
Sickle*	16.2	18.1	15.1	*0.41*
Saw*	13.1	11.9	13.8	*0.56*
Pick*	9.3	13.6	7.0	*<0.05**
Pitchfork	4.7	6.5	3.8	*0.26*
Scythe*	4.3	5.3	3.7	*0.32*
Crane/winch*	2.3	6.4	0.2	*<0.01***
Tractor*	0.6	0.8	0.6	*0.97*
Other	3.6	2.0	4.4	*0.18*
None	2.5	0.6	3.5	*0.5*
DK/NR	1.4	0.6	1.8	*0.4*
Total using dangerous tools	**92.0**	**97.5**	**89.1**	***<0.01****

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 7 days and could describe their main activity.
Note: Multiple response items; totals may not add up to 100 percent.
* Tools considered as dangerous. Article 25 of the Paraguay labor code forbids children work with machines and tools of sharp, trapping, pinching or crushing nature.

Finally, and in line with the companion to Convention 182, Recommendation 190, this study also explored whether children were exposed to physical, psychological, or sexual abuse. From all the types of abuse asked in the children survey, physical abuse ("they hit you") was the type reported most by working children and sugarcane children in particular (7.0 and 6.8 percent respectively). Other types reported include verbal or psychological abuse ("They reprimand you using bad words," 4.9 percent of sugarcane children) and minor reprimands ("they reprimand you, but without bad words," 3.3 percent of sugarcane children).

This study also explored the presence of sexual abuse at work. This topic, which is extremely sensitive with both adults and children, was explored indirectly by using "courteous" terms that children would understand without feeling offended. Two items were developed in discussion with the field teams that were felt to be culturally appropriate and valid indicators of sexual abuse.

The first of these two indicators was softer ("*te faltan al respeto*" or "they disrespect you"). Approximately 1.9 percent of sugarcane children reported sexual abuse based on this indicator. The second indicator was more explicit, and probably more reliable ("*te faltan al respeto de forma grosera*" or "they disrespect you rudely"). Only 0.9 percent of sugarcane children reported sexual abuse based on this indicator.[48]

When all types of abuse are combined, the total abuse rate is quite high for all working children, with sugarcane children enduring more abuse of any type at work (13.1 percent) than do other working children (9.9 percent).

Table VI-27. Exposure to Abuse at Work by Children in Sugarcane-Producing Areas Who Worked in the Last 7 days (RQ #7)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
% Exposed to Abuse at Work	**%**	**%**	**%**	
How do they treat you at work?				
They reprimand you using bad words	2.4	4.9	1.1	*0.10*
They reprimand you, but without bad words	1.7	3.3	0.9	*0.09*
They hit you	7.0	6.8	7.2	*0.89*
They disrespect you (sexual abuse)	1.9	1.9	1.9	*0.95*
They disrespect you rudely (sexual abuse)	0.3	0.9	0.0	*0.17*
They discount your salary	0.0	0.0	0.0	-
Other	0.6	0.6	0.6	*0.97*
Total suffering abuse at work	11.0	13.1	9.9	*0.29*

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 7 days and could describe their main activity.
Note: Multiple response items, totals may not add up to 100%.

The majority of sugarcane children reported using basic protective gear including long-legged pants (98.1 percent), long-sleeved shirts (97.1 percent), hats/caps (97.3 percent), and shoes (73.6 percent). These types of protective gear are adequate to protect children from exposure to the sun, one of the main hazards they face; from minor bruises and cuts resulting from direct contact with sharp sugarcane leaves, in the case of shirts and pants; or from hazards derived from direct contact with the soil, in the case of shoes. However, few children wear any gear that protects them from more serious cuts and lacerations. For example, only 3 in 10 children in sugarcane work use boots and gloves in their work. However, sugarcane children wear protective gear to a significantly greater extent than do other working children.

Adult supervision represents another protective measure. Most sugarcane children are supervised by adults at work (90.6 percent versus 80.5 percent among the non-sugarcane children). A majority of the sugarcane children who are supervised (72.3 percent) were supervised by their parents/guardians, although the proportion supervised directly by an employer (12.8 percent) is greater than among other working children.

[48] Results of self-reports on these topics should be viewed with caution, due to the potential for under-reporting.

Table VI-28. Protective Measures for Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
Protective Measures	**%**	**%**	**%**	
Use of Protective Gear				
Long-legged pants	91.8	98.1	88.4	*<0.01***
Long-sleeved shirt	90.6	97.1	87.2	*<0.01***
Hat/cap	87.1	97.3	81.7	*<0.01***
Shoes	64.5	73.6	59.8	*<0.01***
Sandals	54.1	59.1	51.5	*0.12*
Boots	25.7	31.4	22.8	*<0.05**
Gloves	17.3	30.2	10.4	*<0.01***
Others	0.4	0.0	0.7	*0.30*
None	1.6	0.2	2.4	*0.05*
Are you supervised by an adult in your work? (% Yes)[1]	**84.0**	**90.6**	**80.5**	***<0.05****
By Whom?[2]				
Parent/guardian	78.2	72.3	81.8	
Elder brother/sister	4.2	6.4	3.0	
Other relatives	7.9	6.4	8.9	*<0.05**
Employer	7.4	12.8	4.2	
Others	0.8	0.7	0.8	

Source: Paraguay Children Survey (July-August 2011).
[1] Base: Children who worked in the last 7 days and could describe their main activity.
[2] Base: Children who worked in the last 7 days, could describe their main activity, and are supervised by an adult at work.
Note: Multiple response items; totals may not add up to 100 percent.

Paraphrasing Convention 182, the workplace hazards discussed earlier in this section represent the different types of work that, by the nature or circumstances in which they are carried out, are likely to harm the health, safety, or morals of children, and can therefore considered hazardous work. The hazards explored represent an exhaustive inventory, adapting the specific types of hazardous work mentioned by ILO Recommendation 190 (Section IV) to the context of agricultural activities in sugarcane-producing areas of Paraguay.

Table VI-29. Correspondence Between ILO R. 190 and Questionnaire Items Used in Definition of Hazardous Work

ILO R. 190 Component	Corresponding Child Questionnaire Item
Work that exposes children to physical, psychological, or sexual abuse	1001
Work underground, under water, at dangerous heights, and in confined spaces	534
Work with dangerous machinery, equipment, and tools, or that involves the manual handling or transport of heavy loads	533, 535b, 535c
Work in an unhealthy environment which may, for example, expose children to hazardous substances, agents or processes, or to temperatures, noise levels, or vibrations damaging to their health	535b, 535c
Work under particularly difficult conditions such as work for long hours or during the night, or work where the child is unreasonably confined to the premises of the employer	518 to 530c

In order to determine the total proportion of children in hazardous work, a summary measure was developed to take into account exposure to any of the workplace hazards mentioned above. If a child is exposed to any of the hazardous agents or processes listed on Table VI-24 or Table VI-25, uses any dangerous tools (Table VI-26) or is exposed to any type of abuse (Table VI-27), that child is considered to be in hazardous work. Based on this summary measure, 100 percent of sugarcane children are in hazardous work. This is not surprising considering the many hazards involved in sugarcane work. Just based on one component (use of dangerous tools), 97.5 percent of sugarcane children would already be in hazardous work. Hazardous work is however widespread in sugarcane-producing communities; a statistically similar proportion of children in other work are also exposed to hazardous work.Table VI-30. Prevalence of Hazardous Work among Children in Sugarcane-Producing Areas Who Worked in the Last 7 Days (RQ #7)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	102,388	35,289	67,099	
n=	422	170	252	
	%	%	%	
Hazardous Work	98.7	100.0	98.0	*0.07*
Non-hazardous Work	1.3	0.0	2.0	
Total	**100.0**	**100.0**	**100.0**	

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 7 days and could describe their main activity.

f. Health Status of Working Children

As we have seen in Section VI.e.ii.5, Paraguayan children working in sugarcane are exposed to hazardous working conditions that can be a threat to their short- and long-term health and well-being. While this causal link is obvious, establishing the impact of work on health outcomes is however not always feasible. Children who work may be exposed to a set of hazardous factors, but those factors may not immediately impact their health, but accumulate overtime. The final long-term impact may interact with other factors such as education (O'Donnell, Van Doorslaer & Rosati, 2002), and the relative contribution of each factor being difficult to quantify. Health measures used in this research try to make the link explicit by asking children if they have been injured or sick as a result of work. These measures are in any case based on self-reports, and will only be as accurate as the insight children may have about the cause of their injuries or illnesses.

Another analytical problem is to determine whether sugarcane children would be healthier if they would not work. Removing the children from the hazardous working situation does not mean that their health outcomes will necessarily improves. Children may be exposed to other health hazards outside of work on the one hand, and in cases of extreme poverty, the foregone incomes may harm the families' ability to obtain adequate sustenance and health care. The use of reference groups should offer some clues as to whether the net effect of sugarcane work on health is negative or positive, other factors such as geographical setting and household background being equal.

i. Work-Related Illnesses

Children in this study were asked to provide information on illnesses they perceived to be related to their work. As we have discussed above, drawing the causal link between working conditions and work-related illnesses is difficult. Differently from work-related injuries, where a specific activity may have immediately resulted in a specific injury, illnesses caused by work may be

lagged, accumulate overtime, or not recognized as related to working conditions. Self-reports from children on work-related illnesses are likely to be unreliable and so are not discussed in this section. Results can however be found on Appendix B.

ii. Work-Related Injuries

Children working in the sugarcane industry carry out heavy work with dangerous tools, such as machetes and knives, while exposed to extreme weather conditions, including high temperatures and sun exposure. These hazardous working conditions put them at risk of work-related injuries. Indeed, about one in four sugarcane children (25.7 percent) reported having been injured at work, although the prevalence of work-related injuries is only slightly higher than among children in other activities (20.8 percent). The children interviewed in this research were prompted a second time to aid recall by being asked about any injuries to specific body parts. Sugarcane children reported mostly injuries to their wrist/hand/fingers, which is consistent with the risk of accidental cuts stemming from the use of sharp machetes reported earlier.

Table VI-31. Prevalence of Work-Related Injuries among Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	120,162	47,648	72,514	
n=	503	230	273	
	%	%	%	
Have you ever been injured while working? (% Yes)	**22.7**	**25.6**	**20.7**	***0.18***
Since (month) last year, did you suffer any work-related injury to your____?				
Head/Skull	0.8	0.2	1.2	*0.10*
Face	0.7	0.8	0.6	*0.67*
Neck	0.2	0.6	0.0	*0.22*
Shoulder/Chest/Back	1.9	0.6	2.8	*0.05*
Abdomen	0.3	0.4	0.3	*0.77*
Pelvic Region	0.7	0.6	0.7	*0.82*
Arm	3.7	3.3	4.0	*0.67*
Hand/Wrist/Fingers	8.5	11.4	6.6	*<0.05**
Leg	4.9	5.9	4.3	*0.36*
Foot/Ankle/Toes	6.1	4.9	6.9	*0.26*
Other	0.2	0.2	0.2	*0.42*
None	78.2	75.4	80.0	*0.21*
DK/NR	0.6	0.8	0.4	*0.34*

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 12 months and could describe their main activity.
Note: Multiple response items; totals may not add up to 100 percent.

Among those sugarcane children who were injured at work in the last 12 months, about one in three were injured within the previous month. On average, sugarcane children who suffered a work-related injury had 1.9 injuries in the previous 12 months, a number similar to children working in other sectors (Table XI-9, Appendix A).

This study implemented an in-depth module with children who reported a work-related injury in the last 12 months, including the part of the body injured, type of injury, activity performed when injured and severity of injury. After piloting, it was decided to cap the number of injuries reported to a maximum of three, which was considered the limit of what children could reliably report. The results of this analysis are presented below at the aggregate level, so children who reported three or more injuries in the last 12 months weight thrice as much as children who only had one.

Sugarcane children suffer mostly cuts/lacerations (60.8 percent) to their extremities, mainly their hands, wrists or fingers (33.3 percent), legs (25.0 percent) and foot, ankle or toes (21.6 percent). Although cuts are not uncommon among children in other occupations in the survey population (43.1 percent), the proportion of injuries that sugarcane children receive in their hands, wrists or fingers is significantly higher than for other working children.

Besides cuts or lacerations, bruises/contusions and scrapes/abrasions are both mentioned 9.8 percent of the time. It is interesting to see that insect or snake bites, which are readily identified by children as a common workplace hazard, are rarely or never mentioned as a cause of injuries.

Table VI-32. Types of Work-Related Injuries Among Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months (Last 3 Injuries)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	25,552	11,341	14,212	
n=	117	61	56	
	%	%	%	
What part of the body was injured?				
Head /Skull	1.7	1.9	1.6	*0.88*
Face	1.7	2.0	1.6	*0.87*
Neck	1.7	2.0	1.6	*0.87*
Shoulder/Chest/Back	7.7	3.8	10.8	*0.16*
Abdomen	1.7	2.0	1.6	*0.87*
Pelvic Region	0.9	2.0	0.0	*0.26*
Arm	13.8	13.5	14.1	*0.93*
Hand/Wrist/Fingers	24.3	33.3	17.2	*<0.05**
Leg	24.1	25.0	23.4	*0.85*
Foot/Ankle/Toes	28.7	21.6	34.4	*0.13*
Internal Injuries	0.0	0.0	0.0	-
DK/NR	26.7	21.2	31.3	*0.22*
What type of injury occurred?				
Scrape/Abrasion	12.1	9.8	13.8	*0.51*
Bruise/Contusion	11.3	9.8	12.5	*0.65*
Sprain/Strain/Torn Ligament	2.6	0.0	4.7	*0.12*
Broken Bone/Fracture	0.9	2.0	0.0	*0.26*
Dislocation	1.7	3.8	0.0	*0.11*
Cut/Laceration	50.9	60.8	43.1	*0.06*
Puncture/Stab/Jab	2.6	0.0	4.7	*0.12*

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
Muscle Pain	4.3	1.9	6.3	*0.25*
Loss of Body Part	0.0	0.0	0.0	-
Nerve Injury	0.0	0.0	0.0	-
Burn /blister/scald	1.7	0.0	3.1	*0.20*
Insect bite (spider, *vinchuca*, scorpion)	1.7	2.0	1.6	*0.87*
Animal bite (snake, dog, etc.)	0.0	0.0	0.0	-
Other	0.0	0.0	0.0	-
DK/NR	27.8	23.5	31.3	*0.36*

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 12 months, could describe their main activity, and suffered work-related injury in the last 12 months.
Note: Multiple injuries (up to 3), parts of the body, and types of injury possible; totals may not add up to 100 percent.

Sugarcane children are getting hurt mostly while peeling sugarcane leaves (31.4 percent). This is not surprising, as the way this activity is performed is inherently risky; children (and adults) peel sugarcane leaves by holding the cane with the non-dominant hand and swinging the *machetillo* back and forth with the dominant hand along the cane. The swing is repeated multiple times until the cane is completely peeled and is ready to be loaded on the cart. The first move of the swing is done from the body outwards, with the blade facing away from the body. The return move is done with the blade facing the body, to be able to peel leaves on the way back as well. This return move requires great precision, as taking it just a few inches too close will result in the sharp *machetillo* hitting the peeler's non-dominant hand, which is holding the cane. Since most children do not wear gloves while performing this activity, this return move is arguably when most injuries occur.

Besides peeling sugarcane leaves, two other activities appear to cause injuries. Cutting down sugarcane is mentioned 9.8 percent of the times. This task is typically done with the non-dominant hand holding together a bunch of canes while the dominant hand hits and cuts the canes with the machete. Although this task requires greater strength than peeling sugarcane leaves, the risk of injuries is lower, as the machete is typically swung a safe distance away from the body/extremities.

Manually loading the cart is also mentioned 9.8 percent of the times. This task requires lifting bunches of peeled sugarcane that are lying on the floor to load them on a small cart, typically at waist height. Sometimes the sugarcane bunches have to be transported by hand for some distance until they are loaded on the cart. A specific analysis of the types of injuries mentioned indicates that this activity leads mostly to bruises or contusions.

It is finally worth noting that children who have a main occupation other than sugarcane-related activities also get hurt while performing sugarcane-related activities. Although these children work on sugarcane only sporadically and get injured mainly while doing "other work" (43.8 percent), some of their injuries also occurred while peeling sugarcane leaves (7.8 percent) or cutting down sugarcane (6.3 percent), as well as a smaller proportion of other sugarcane-related activities. In contrast, only a small proportion of the injuries reported by sugarcane children occurred while doing non-sugarcane work (5.9 percent).

Table VI-33. Activity Performed When Injured Among Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months (Last 3 Injuries)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	25,552	11,341	14,212	
n=	117	61	56	
	%	%	%	
What were you doing when you got hurt?				
Cleaning/weeding/burning weeds from the land for s.c.	7.8	11.8	4.7	*0.16*
Working in the sowing of s.c.	0.0	0.0	0.0	-
Fertilizing the s.c. fields	0.0	0.0	0.0	-
Fumigating s.c.	0.0	0.0	0.0	-
Burning the s.c. fields before the harvest	1.7	0.0	3.1	*0.20*
Cutting down s.c.	7.8	9.8	6.3	*0.48*
Peeling s.c. leaves	18.3	31.4	7.8	*<0.01***
Manually loading s.c. cart	4.3	9.8	0.0	*<0.05**
Weighting and/or loading s.c with a winch	1.7	2.0	1.6	*0.87*
Transporting s.c. to the factory with cart/truck	0.0	0.0	0.0	-
Driving a tractor for s.c. work	0.0	0.0	0.0	-
Bringing lunch to workers on a motorbike	0.0	0.0	0.0	-
On my way to work	0.9	2.0	0.0	*0.26*
Doing other s.c. related activities	2.6	0.0	4.6	*0.12*
Doing other work	27.0	5.9	43.8	*<0.01***
Doing household chores	4.3	3.9	4.7	*0.84*
Playing	0.0	0.0	0.0	-
Doing other task not related to work	0.0	0.0	0.0	-
DK/NR	30.2	25.5	33.8	*0.33*

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 12 months, could describe their main activity, and suffered work-related injury in the last 12 months.
Note: Multiple injuries (up to 3) possible; totals may not add up to 100 percent.

The injuries suffered by sugarcane children do not appear to be very severe. For more than half of the injuries reported, the normal activities of children were not restricted or were restricted by less than a day, a level similar to children working in other activities. None of the children who had primarily worked in sugarcane-related activities in the last 12 months were permanently disabled as a result of their injuries.

To simplify this analysis, restriction categories were grouped into two groups: 1) minor injuries, which include those that caused no restriction or restricted normal activities by less than 1 day, and 2) moderate/severe injuries, which includes those that restricted normal activities by 1 or more days, or caused permanent disability. When we group categories this way, we find that 25.5 percent of sugarcane children had suffered at least one injury in the last 12 months that had restricted their activities for 1 or more days, compared with 15.6 percent of children working in other activities. Although this difference does not reach statistical significance at ordinary levels, given the small sample size, it could be an indication that sugarcane children could be more prone to moderate/severe injuries than are children in other sectors.

Table VI-34. Severity of Work-related Injuries Among Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	25,552	11,341	14,212	
n=	117	61	56	
	%	%	%	
How long were your normal activities restricted as a result of this injury?				
No restriction	40.5	40.4	40.6	0.98
Less than 1 day	18.1	13.5	21.9	0.24
Less than 7 days	12.1	17.3	7.8	0.12
Less than 14 days	3.5	2.0	4.7	0.43
Less than 1 month	2.6	5.8	0.0	0.05
1 month or more	3.5	3.9	3.1	0.82
Permanently disabled	0.9	0.0	1.6	0.37
DK/NR	30.4	27.5	32.8	0.54
Cumulative less than 1 day	**54.3**	**49.0**	**58.5**	**0.31**
Cumulative more 1 day or more	**20.0**	**25.5**	**15.6**	**0.19**

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 12 months, could describe their main activity, and suffered a work-related injury in the last 12 months.
Note: Multiple injuries (up to 3) possible; totals may not add up to 100 percent.

The relatively low severity of most sugarcane-related injuries may explain why certain processes persist, such as the technique for peeling sugarcane leaves, even though they are predictably dangerous. This relatively low severity may also explain, at least partially, why only 43.1 percent of sugarcane children had received any treatment for their injuries. Among those that are treated, most had resorted to self-medication (54.8), followed by health clinics (22.2 percent), and public hospitals (16.7 percent, see Table XI-8, Appendix A). Differently from work-related illnesses, the treatment that sugarcane children had received for their injuries appears to be similar to that for other working children, although the sample size is too small to provide a definitive answer.

iii. Impact of Work-Related Injuries on Household Income

Children's work-related injuries are first and foremost harmful to children's health, but they may also be detrimental to their households' income. This impact can be the result of foregone incomes if children have to stop working and/or if someone has to stop working to look after them. It can also be the result of the total cost of health care, including medical expenses, drugs and transportation.

This study attempted to estimate the impact of children's work-related injuries on household incomes by collecting data on these cost elements from household informants. Interestingly, but unfortunately, household informants only reported a fraction of the injuries identified by children. According to household informants, only 1.6 percent of sugarcane children have ever been injured at work. This finding is in line with the overall discounting of children's work-related activities by adults; it also further underlines the fact that most work-related injuries suffered by children are probably not severe enough to register with adults in the households.

Only eight sugarcane children (representing an estimated population of 777) were identified by household informants as injured in the last 12 months. ICF Macro attempted to measure the impact of work injuries on household income, but had an insufficient sample base due to the small number of injuries reported. While the results obtained from such a sample are at best qualitative,[49] the main impact from these work-related injuries was reportedly money lost because the injured person stopped working (3 out of 8), which led to an average loss of 208,333 *Guaraníes* (approximately 53 USD).[50] Money lost due to medical expenses was mentioned by two out of eight cases, with an average reported loss of 150,000 Guaraníes (38 USD), and money lost because someone had to stop working to look after the injured person was mentioned by one out of eight cases, with a loss of 105,000 Guaraníes (27 USD).

Although the sample is too small to draw any conclusions, it is possible that household informants only noticed the truly severe injuries that had a real impact on the household's income, in which case the estimated impact of work-related injuries on household incomes would be reasonably unbiased and very small.

g. Estimated Prevalence of Children in Forced Labor, Bonded Labor, and Trafficking

In Paraguay, bonded labor has been reported among agricultural workers on the estates and ranches of the Chaco region. There are also reports of forced labor conditions among children working, as domestic servants, and children were used for illicit activities such as drug smuggling along the border with Brazil (U.S. Department of State, 2010). According to the U.S. Department of State Trafficking in Persons report (2011), child trafficking is also a problem in Paraguay, particularly for poor children from rural areas who are trafficked for commercial sexual exploitation and domestic servitude to urban centers such as Asunción, Ciudad del Este, and Encarnación.

However, as we have seen in Section VI.e, sugarcane children work primarily in a family context within their communities. Worst forms of child labor, other than hazardous work, seem a priori unlikely in this environment. Nevertheless, this section analyzes the existence of any working conditions that can be considered as forced labor, bonded labor or child trafficking among sugarcane children in Paraguay.

i. Forced/Bonded Labor

Forced labor, as defined in this report includes "any work or service which is exacted from any person under the menace of any penalty and for which said person has not offered himself voluntarily." This definition becomes problematic when the person is a child and the employer her or his parent. In this case, the 1956 Supplementary Convention is helpful, as it clarifies that forced labor includes "any institution or practice whereby a child or young person under the age of 18 years, is delivered by either or both of his natural parents or by his guardian to another person, whether for reward or not, with a view to the exploitation of the child or young person or of his labour." It is therefore necessary to establish first that the child has been delivered to another person with a view to the exploitation of the child. As Table VI-35 indicates, only 12.5 percent of

[49] As such, only unweighted figures are reported in this paragraph.
[50] Based on a September, 2011 exchange rate of 1 USD = 3.900 Guaraníes.

sugarcane children are not working for a parent or with a parent, and can therefore be considered to be working for another person.

Table VI-35. Employer of Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months (RQ #8)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	120,162	47,648	72,514	
n=	503	230	273	
Employer	**%**	**%**	**%**	
Do you work for____?				
For your parents	76.7	72.1	79.7	*<0.05**
With your parents, but for other person	8.5	15.1	4.2	*<0.01***
For other relative	7.6	4.1	9.9	*<0.05**
For other non-relative	7.2	7.9	6.7	*0.60*
Other	1.1	0.6	1.5	*0.25*
DK/NR	0.6	0.5	0.7	*0.82*
Total not working for or with a parent	**14.9**	**12.5**	**16.5**	***0.42***

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 12 months and could describe their main activity.
Note: Multiple response items; totals may not add up to 100 percent.

Following ILO C. 29 and the latest guidance from the ILO (2011), this study identified two main components of forced labor: 1) coercion ("menace of any penalty") and 2) deceptive recruitment ("not offered voluntarily").[51] Indicators of coercion in this study included any menaces from the employer (Item 903 in Appendix E). Deceptive recruitment was established by whether any promises from the employer about the job were broken after starting to work (Items 901 and 902 in Appendix E). This study estimates that no sugarcane children were recruited under deceptive or coercive situations. Given that both conditions are necessary to establish forced labor conditions, it is estimated that no sugarcane children in Paraguay are in forced labor conditions.

Bonded labor is a sub-category of forced labor (see definition in Section IV) with three main components, each of them measured by specific indicators on the child questionnaires:

- Pledge of personal services as security for debt (item 907)
- Value of services not being reasonably applied towards liquidation of the debt (items 908, 909, 910)
- Length and nature of those services not respectively limited and defined (item 911).

No sugarcane children met the first necessary condition (working to pay back debt). Therefore it is also estimated that no sugarcane children in Paraguay are in bonded labor conditions.

[51] Survey questions by ILO (2011) have three conditions: 1) deceptive recruitment, 2) coercion, and 3) impossibility to leave. The definition of forced labor according to Convention 29 only has two components: 1) not offered voluntarily (deceptive recruitment) and 2) menace of penalty (coercion). Impossibility of leaving is a function of menace of penalty; if the menace of a penalty can be established, impossibility of leaving is established implicitly. This study does not, therefore, include impossibility of leaving explicitly in the operational definition of forced labor.

Table VI-36. Prevalence of Forced and Bonded Labor Conditions Among Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months (RQ #11)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	120,162	47,648	72,514	
n=	503	230	273	
	%	%	%	
Forced Labor Components				
Coercion	0.2	0.0	0.3	*0.62*
Deception	0.2	0.0	0.4	*0.29*
Forced Labor Prevalence				
Forced labor	0.0	0.0	0.0	-
Bonded labor	0.0	0.0	0.0	
Non-forced labor	100.0	100.0	100.0	

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 12 months and could describe their main activity.

ii. Labor Migration and Trafficking

Labor migration in Paraguay follows two general pathways: 1) internal migration from rural areas to the urban areas within Paraguay, mostly Asunción, and 2) emigration to foreign countries, mainly Argentina and Spain. Internal migration is part of the ongoing urbanization process in Paraguay, which showed an urban growth rate of 3.2 in 2005–2010, compared to a total growth of rate 2.2 (United Nations Population Fund, 2007). This migration is directed mostly to the main urban area in the country, metropolitan Asunción. External migration has a sizeable prevalence in Paraguay. In 2009, approximately 500,000 native Paraguayans were living abroad, with 280,000 or about 1 in 10 economically active persons emigrating in 2001–2007 (United Nations Development Programme, 2009). Rural emigrants are overrepresented, with 48.1 percent of recent migrants (compared with 39 percent in the total population).[52] According to the UNDP (2009), main destinations for recent emigrants are Argentina (60.8 percent), Spain (31.7 percent), Brazil (2.8 percent), and the United States of America (0.9 percent). It is estimated that 13.5 percent of rural households in Paraguay have a household member working abroad.

Although Paraguay has experienced a significant commodity-led export boom in recent years, this growth has been based on capital and technology-intensive exploitation of land resources for the production of crops for export. Growth in agricultural output has not resulted in the net creation of more or better quality jobs (Borda y González, 2009). It seems thus that rural areas in Paraguay are experiencing a gradual population drain towards urban areas and foreign countries, and that the rural economy is not attracting labor migrants.

It is therefore not surprising to find that the sugarcane industry employs primarily local workers. Only 7.4 percent of sugarcane children reported being born in a different district from where they currently live. The analysis of labor migration among child workers is important, as it may be an indicator of child trafficking situations. It is necessary, however, to prove that this movement was

[52] Source: CIA World Factbook, 2010.

for the purpose of labor exploitation (see definition in Section IV). Most of the children born in a different district moved to the current location with their families, though, with only 0.5 percent of sugarcane children coming from a different district without a parent or spouse. No sugarcane children reported having a job waiting for them when they moved to their current location.

Table VI-37. Migration Among Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months (RQ #12)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	120,162	47,648	72,514	
n=	503	230	273	
Employer	**%**	**%**	**%**	
Where you born elsewhere? (% Yes)[1]	7.5	7.4	7.6	0.96
When you came here, did a parent or spouse come to live with you? (% No)[2†]	12.8	X	X	X
Total born elsewhere who did not come with a parent or spouse to live with them[1]	0.9	0.5	1.2	0.37

Note: Multiple response items; totals may not add up to 100 percent.
† Insufficient sample size.

Considering that no case in the data shows the minimum conditions, it is estimated that there are no sugarcane children in trafficking conditions in Paraguay. None of the children working in other activities in sugarcane areas were considered to be in trafficking conditions either.

Table VI-38. Prevalence of Child Trafficking Among Children in Sugarcane-Producing Areas Who Worked in the Last 12 Months (RQ #11)

	Total	Children Working in Sugarcane	Children in Other Work	*p*-value
N=	120,162	47,648	72,514	
n=	503	230	273	
	%	**%**	**%**	
Trafficking	0.0	0.0	0.0	-
Non-trafficking	100.0	100.0	100.0	-
Total	**15.1**	**15.1**	**15.1**	**-**

Source: Paraguay Children Survey (July-August 2011).
Base: Children who worked in the last 12 months and could describe their main activity.

h. Worksite Observations

ICF Macro considered that adding worksite observations would provide more insight into the nature and welfare implications of child labor in sugarcane. To this end, the household and working children survey results are complemented by observations of sugarcane farms where children were carrying out sugarcane-related activities at the time of the observation.

This section is based on a field observation of 82 working children in 47 different locations of Paraguay, with the number of worksites distributed roughly proportionately to the number of sugarcane farms in each department (Table VI-39). These worksites were identified by field supervisors while conducting fieldwork in the sugarcane areas sampled for household and children interviews. Once a worksite had been identified, a supervisor or a trained interviewer would approach

it to conduct a worksite observation using a worksite observation checklist (Appendix F). The observation checklists included a wide range of variables in 7 different categories: (1) personal data (including age and sex of the child), (2.1) appearance of disability, (2.2) appearance of injury, (3) emotional appearance, (4) work (5) working environment, and (6) physical risks associated with the child's work. While in the field, observers estimated children's ages; documented the physical and emotional conditions of the children; and observed the activities and working environment of children. These observations were conducted as unobtrusively as possible, often without the children's knowledge and without any interruption from their daily routines.

It is important to note, however, that the sample of worksites was not probabilistic and cannot be generalized to the greater population of sugarcane children in Paraguay. The number of worksite observations was limited; so the data presented in this section must be interpreted qualitatively. To this end, tables in this section present raw numbers rather than percentages, given the small sample size.

Table VI-39. Number of Worksite Observations and Children Observed in Sugarcane Farms, by Department

	Number of Worksite Observations	Number of Children
Cordillera	4	6
Guaira	19	40
Caaguazu	12	15
Caazapa	6	11
Paraguari	6	10
Total	**47**	**82**

Source: Paraguay Worksite Observations (July-August 2011).

The sample observed included 69 boys and 13 girls. According to the observers' estimations, 67 percent of the 82 working children observed in the field were within the legal age for work (14 years and older). This proportion is higher than the proportion of currently active children who are 14 years and older according to either adult or child reports (Table VI-1). Given the small cell sizes for girls, the remaining tables only present disaggregated data by age.

Table VI-40. Number Child Workers Observed Working in Sugarcane Farms, by Gender and Age

	Total n	Male n	Female n
5–13 years	27	21	6
14–17 years	55	48	7
Total	**82**	**69**	**13**

Source: Paraguay Worksite Observations (July-August 2011).

Consistently with reports from children and adults, most sugarcane children were involved in peeling sugarcane leaves (61 in 82) and cutting down sugarcane (44 in 82). Also consistently with household and child interviews, older children have a heavier involvement in cutting down sugarcane in particular than younger children. Manually loading the cart with sugarcane is reported more often by children and adults than by observers, although this is probably a function of the timing of the observations: it takes less time to load the cart than to cut and peel sugarcane, and this activity is typically done at the end of the workday. Two of the 27 children within the younger age-group were just accompanying their relatives. Younger children are usually brought to the field

along with the rest of the family. This process facilitates their gradual introduction to sugarcane work, which typically starts as play while the rest of the family works, evolves to providing minor assistance to working relatives (carrying tools or doing other errands), then into low-intensity work peeling sugarcane leaves or doing other light tasks, until the child is old or strong enough to carry out the heavier activities such as cutting down sugarcane.

Table VI-41. Child Activities Observed, by Age

	Total	14–17	5–13
Sugarcane-related Activities			
Clear/weed/burn land for sugarcane	7	7	0
Sow sugarcane	4	4	0
Fertilize the sugarcane fields	1	1	0
Burn sugarcane fields in preparation for the harvest	2	2	0
Cut down sugarcane	44	35	9
Peeling sugarcane	61	39	22
Manually loading cart with sugarcane	8	8	0
Helping to weigh and load cane into truck with crane/winch	6	6	0
Transport sugarcane to the sugar mill with horse-cart/oxen-cart/truck	8	8	0
Accompanying relatives, but not working	2	0	2
Other	1	1	0
Total	**82**	**55**	**27**

Source: Paraguay Worksite Observations (July-August 2011).

Most children were observed standing next to the standing canes or on the cut canes. These two general locations on the farm are consistent with the main activities they are performing, since sugarcane is cut next to the standing canes and sugarcane leaves are typically peeled a bit further back, on the canes that have already been cut. Canes can also be peeled by the same person who cuts them down. These two locations are likely to expose the children to insects and/or snakes, and make them prone to tripping, as the ground is uneven and covered with canes and peeled leaves.

Table VI-42. Child Location on the Worksite, by Age

	Total	14–17	5–13
Location			
Next to the standing canes	56	43	13
On the cut canes	40	24	16
Near/on the crane/winch	8	8	0
On the road	2	1	1
Physical Position			
Standing	69	50	19
Sitting	22	13	9
Hunched Over	7	6	1
Leaning or Bending	1	1	0
Unstable standing or sitting position on truck, winch, cart	1	1	0
Total	**82**	**55**	**27**

Source: Paraguay Worksite Observations (July-August 2011).

Consistently with child self-reports (Table VI-28) a majority of children observed were working under the supervision of an adult. This is especially true for younger children, all of whom were supervised. While few children were working in isolated areas (10 in 82), most are working out in the open, and only 14 in 82 children were observed in protected/guarded workplaces. A slight majority of children (46 in 82) have access to clean drinking water. This water is likely brought to the farm by children themselves in plastic containers used for drinking *tereré/mate*, a local herbal tea (and the national drink of Paraguay). Only a few children had access to toilet facilities (8 in 82), and no children had access to first aid kits or a medically trained person.

Table VI-43. Child's Working Environment, by Age

	Total	14–17	5–13
Working environment			
Is the child being supervised by an adult?	76	49	27
Is the child's workplace isolated?	10	5	5
Is the child's workplace protected/guarded?	14	7	7
Does the child have access to clean drinking water?	46	33	13
Does the child have access to toilet facilities?	8	6	2
Does the child have access to First-aid/Medically Trained Person?	0	0	0
Total	**82**	**55**	**27**

Source: Paraguay Worksite Observations (July-August 2011).

Most children observed were exposed to dangerous tools such as machetes (57 in 82) and *machetillos* (45 in 82), which are respectively used to cut down sugarcane and peel sugarcane leaves. Few children were also exposed to hoes (three in 82), which are typically used for weeding and cleaning the land. The main types of machinery to which sugarcane children are exposed are horse-carts and oxen-carts (10 and 9 in 82, respectively) which are typically used to transport sugarcane from the field to the truck or directly to the factory. Only a small number were exposed to tractors or cranes/winches.

Table VI-44. Child's Exposure to Tools/Machinery, by Age

	Total	14–17	5–13
Tools			
Machete	57	42	15
Machetillo	45	26	19
Hoe	3	2	1
Machinery			
Crane/winch	1	1	0
Tractor	3	3	0
Horse-cart	10	2	8
Oxen-cart	9	9	0
Total	**82**	**55**	**27**

Source: Paraguay Worksite Observations (July-August 2011).

Children in sugarcane worksites are also exposed to several chemical, physical, and biological hazards. Consistently with sugarcane children's self-reports, sun exposure, extreme heat, and cuts are the main hazards these children are exposed to, followed by insects and slip/trip/falling hazards. One major divergence from the children's self-reports is exposure to snakes, which the children reported to a much larger degree. While snakes may be hard to detect during a worksite observation, it seems likely that the children may overestimate the hazard snakes represent, particularly considering that none of the children interviewed reported any snake-related injury. Dust or smoke was also reported more often as a hazard by the children than by the observers.

Table VI-45. Child's Exposure to Workplace Hazards, by Age

	Total	14–17	5–13
Chemical Hazards			
Dust/smoke	5	3	2
Pesticides/insecticides/poison	6	4	2
Chemical fertilizers	0	0	0
Physical Hazards			
Extreme heat	49	38	11
Extreme cold	8	7	1
Sun exposure	55	42	13
You can slip/trip/fall	19	10	9
Cuts	42	25	17
Something can fall on you	2	1	1
Biological Hazards			
Insects	24	9	15
Snakes	7	3	4
Total	**82**	**55**	**27**

Source: Paraguay Worksite Observations (July-August 2011).

Besides the hazards mentioned above, observers assessed whether sugarcane children were having any difficulties with their activities. Six children, all from the older age group, appeared to have difficulties carrying a load that seemed too heavy for them. This is often the case when children have to manually load the sugarcane cart or transport bundles of sugarcane to the loading point. It was also observed that three children, particularly the younger ones, lacked the required dexterity to perform their tasks. Children's lack of dexterity when they are cutting sugarcane with a machete or peeling sugarcane leaves with a *machetillo* can cause injuries, such as cuts and lacerations.

Table VI-46. Child's Difficulties, by Age

	Total	14–17	5–13
What kind of problems is the child having?			
Carrying a load too heavy	6	6	0
Lacking the required dexterity	3	1	2
Not paying attention	2	1	1
Getting frustrated	1	1	0
Total	**82**	**55**	**27**

Source: Paraguay Worksite Observations (July-August 2011).

A majority of children wear a long sleeved-shirt, long-legged pants, and a hat to work. This type of clothing, which generally agrees with the sugarcane children's self-reports, protects the children from exposure to sun and from the minor cuts that can result from the sharp sugarcane leaves. However, few children wear gloves, so most children's hands are not protected from cuts.

Table VI-47. Child's Use of Protective Gear, by Age

	Total	14–17	5–13
What protective gear is the child wearing?			
Hat	64	47	17
Gloves	6	4	2
Long sleeved shirt	73	52	21
Long-legged pants	68	44	24
Boots	9	6	3
Shoes	44	33	11
Flip-flops	17	11	6
Total	**82**	**55**	**27**

Source: Paraguay Worksite Observations (July-August 2011).

The children were observed to determine whether they presented any symptoms of disability, sickness, injury, or emotional distress. Virtually no disabilities were observed, except for one child in the 14 to 17 years age group who was using crutches, probably as a result of some injury to the lower extremities. The main types of injury consisted of cuts or abrasions, which were observed for 17 out of 82 children. These observations are generally consistent with the work-related injuries the sugarcane children reported, which offers further confirmation that household informants probably underreport the number of injuries these children suffer.

Finally, a majority of sugarcane children appear to be alert, a necessary condition to avoid injuries, given the number of hazards surrounding sugarcane work. Sugarcane work can be exhausting and an important number of children appeared to be tired (23 in 82). Fewer children seemed worried or fearful, a possible tell-tale sign of child abuse. Observational assessments of emotional appearance are in any case highly subjective and possibly prone to observer error.

Table VI-48. Child's Appearance, by Age

	Total	14–17	5–13
Appearance of Disability			
Limp	0	0	0
Crutches/braces	1	1	0
Missing limb	0	0	0
Deformity	0	0	0
Mental disability	0	0	0
Other	0	0	0
Appearance of Sickness/Injury			
Cough	0	0	0
Cuts/abrasions	17	10	7
Pale color	1	1	0

	Total	14–17	5–13
Insect bites	3	1	2
Animal bites	0	0	0
Rash	1	0	1
Swollen limbs	0	0	0
Bandages	1	1	0
Limp	0	0	0
Other	0	0	0
Emotional Appearance			
Fearful	5	3	2
Worried	8	4	4
Shy	11	7	4
Outgoing	13	5	8
Alert	36	26	10
Tired	23	16	7
Total	**82**	**55**	**27**

Source: Paraguay Worksite Observations (July-August 2011).

In summary, it seems that the results from worksite observations generally confirm the findings from the children interviews, even though these observations only represent a relatively static snapshot of the work of sugarcane children.

VII. CONCLUSIONS

Children working in sugarcane-related activities represent a significant population in Paraguay, both in absolute numbers and as a proportion of the total workforce employed by the sugarcane industry. These children are working in hazardous conditions, either because they are using dangerous tools such as machetes, they work long hours under extreme heat, or they are exposed to some other hazardous agent or process.

These hazardous working conditions appear to have direct effects on the sugarcane children's welfare opportunities, including impacts on their health and education. About one in four sugarcane children (25.6 percent) report having been injured at work, for an average of about two work-related injuries in the last 12 months. Most injuries include cuts or lacerations to the upper and lower extremities while peeling or cutting down sugarcane.

Sugarcane children also have lower school attendance rates than other children in sugarcane areas. Even among children who are attending school, sugarcane children show slower progress and a greater age-grade delay than other children in sugarcane areas. Overall, 14.3 percent of sugarcane children who are attending school reported that work interferes with their studies, and as many as 13.2 percent reported having missed school for work once per week or more often.

Results from this study clearly indicate that sugarcane work represents a hazardous occupation for children, with serious implications for their education and health. Sugarcane work done by children, therefore, qualifies as a WFCL.

VIII. LIMITATIONS OF THE STUDY

This study had a number of limitations resulting both from design and fieldwork challenges that must be taken into account when evaluating the study results. Five limitations in particular merit comment:

The first limitation is inherent to any non-experimental research design. This type of research cannot establish the existence of causal relations between any of the variables being measured. From a scientific standpoint, this study cannot determine whether sugarcane work has a negative or positive impact on children's welfare, because the characteristics measured are occurring naturally in the population (i.e., not controlled) and alternative explanations for their causes and effects cannot be ruled out. While the use of comparison groups provides an approximation to the problem of controlling for alternative explanations, these comparison groups also occur naturally in the population and cannot be expected to be equivalent to sugarcane children in all aspects but involvement in sugarcane work. Differences found between groups can only be used to hypothesize causal directions, based on theoretical and logical assumptions.

The second limitation resulted from non-response to children interviews. Although child non-response rates were generally acceptable and its effects can be adjusted using the weighting methods discussed in Section V.e.vii, non-response is never desirable for two main reasons: First, it reduces the sample available for analysis of children responses, increasing the margin of error of the estimates derived from such responses. Second, although non-response can be adjusted to match known population parameters, the direction of the error is unknown for variables where the population parameter is not known, and so in these cases non-response bias cannot be known or adjusted.

Third, final instruments had some limitations as well. Having to verbally translate from Spanish to Guarani likely led to some measurement error as interviewers may have used slightly different wording of questions. It is not clear to what extent using a Guaraní questionnaire may have reduced the potential for measurement error, as Guaraní questionnaires appear to be relatively uncommon in the Paraguayan research environment and field personnel expressed generalized unease with written Guaraní. This is an area that requires further research. Also, the study was able to do only one pre-test of the study instruments. Several questions were changed after pre-testing and so were not pre-tested at all.

Fourth, the information gathered by the worksite observations was useful to obtain an external account of working conditions in sugarcane farms and to corroborate the findings from the household and children interviews. However the representativeness of this observation exercise is not without limitations. First, although the sample of worksites should be broadly representative of sugarcane farms in Paraguay, it was still non-probabilistic, and so the data from worksite observations cannot be projected to the total population. Second, given the timing of the observation, the activities observed were necessarily biased towards the sugarcane harvest, at the expense of the earlier cultivation activities (clearing land, fertilizing, etc.). This bias was in any case deliberate, as the project was more interested in the more intense and potentially hazardous harvest-related activities. The general agreement between household/children interviews and observational data further justify this rationale.

Finally, as discussed in Section V.d.ii, the inclusion criteria used for reference households introduced a number of complications for the reference groups used in the study:

- Inclusion criteria for sugarcane and reference households were not parallel. Sugarcane households were included in the sample if any member had worked in sugarcane-related activities for at least one hour in the last 12 months. Reference households, on the other hand, were included only if agriculture was their main economic activity. This means that some sugarcane households might have had a main economic activity altogether different from sugarcane work in particular or agriculture in general. Similarly, households with members working in agriculture but with another primary economic activity were excluded from the study sample.
- While the study collected a representative sample of the whole population of children working in sugarcane, it is probable that some children working in non-sugarcane activities (hereafter "other working children") and non-working children in the study areas were excluded from the sample. As a result, comparing children working in sugarcane with children working in other agricultural sectors was not possible as not all children working in agriculture were captured. In this report sugarcane children are compared to children working in non-sugarcane activities and non-working children. Similarly, due to the inclusion criteria for reference households, not all other working and non-working children in the study areas were covered by the sample.

The proportion of the population excluded from the sample can be quantified to some extent. As part of the sampling methodology for this study, every household contacted in the random walk routine was screened to determine its eligibility. The resulting outcome was recorded in field logs, including whether the household was a sugarcane household, a reference household or another type of household. The data from these field logs were used to determine the relative proportion of sugarcane, reference and other households in sugarcane areas, using the extrapolation weights discussed in Section V.e.vii to compensate for unequal selection probabilities. Based on this methodology, it is estimated that 13.2 percent of all households in sugarcane-producing areas were excluded from the final sample. Since no further data was collected from these households, it is not possible to determine how many among these 13.2 percent were involved in agriculture for at least one hour in the last 12 months. Similarly, it is not possible to determine the number of children working in agriculture or other sectors or the number of non-working children excluded from the study.

IX. LESSONS LEARNED

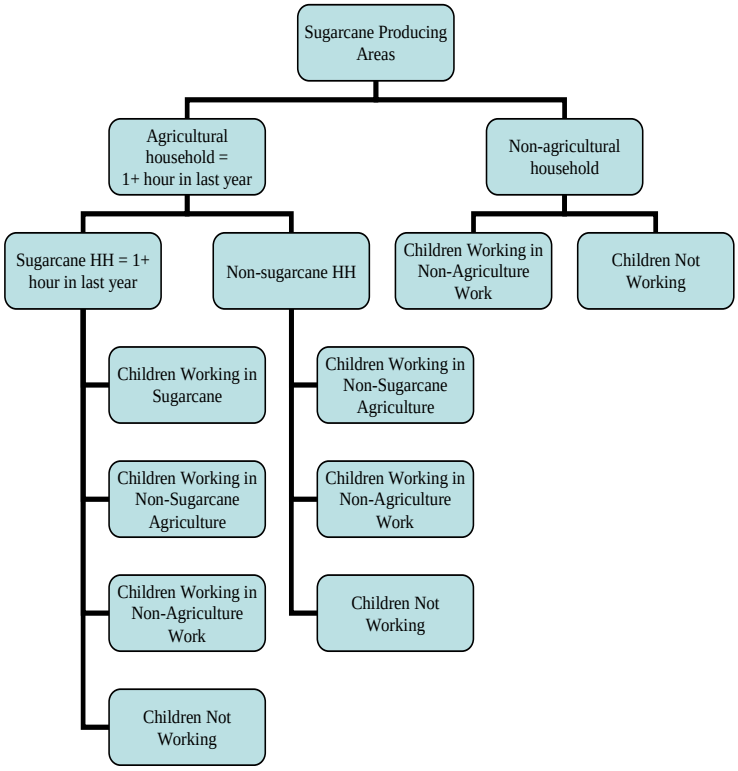
There were several design and fieldwork-related challenges in this survey that represent an opportunity to learn and improve for future projects. One of the main difficulties in this study was defining an adequate reference group. A good reference group should have some parallels to the study group of interest, in this case children working in sugarcane-related activities, and therefore provide a valuable comparison given the study's research questions. Finding such a reference group may however be a challenge. Children in sugarcane households that do not work in sugarcane are likely to be the younger siblings of children who do work, and do not serve as a particularly instructive reference group. Children in sugarcane households where no children work are likely to have only younger children or a wealthier socioeconomic background. For this project it was decided that households that had no sugarcane workers but were primarily employed in agriculture had a good chance to be demographically and socioeconomically similar to sugarcane households. However the areas surveyed in this project were very homogenous and it was often difficult to find sufficient households of each type in a given area: areas with many sugarcane households had few reference households and vice-versa. It would be advisable for future surveys to determine early in the design phase the inclusion criteria for reference groups. The viability of finding such reference units should be tested during early exploratory research or during piloting.

Besides being able to find sufficient reference households, an additional lesson learned concerns the inclusion criteria for reference households. This study attempted to construct a reference group of households that was as similar as possible to sugarcane households, although this expected similarity was based on qualitative assumptions. This led to unparallel definitions for sugarcane households (involvement in sugarcane activities for at least one hour in the last 12 months) and reference households (agriculture as main economic activity) and resulted in the exclusion of other working and non-working children. It also excluded households involved in agricultural work with a non-agricultural main economic activity. Attempting to gather prevalence estimates as well as meaningful comparisons at the household and individual level made the establishment of these definitions complex.

A fully-inclusive approach would have required a different set of inclusion criteria for reference households, depending on the reference group of interest. Given a fully representative sampling of sugarcane-producing areas in Paraguay, as detailed in Figure IX-1, some potential reference groups of children would have included all children in agriculture-related work, or all children working in non-sugarcane activities.

A sample design with children in agriculture-related activities as a reference group would have had the structure shown on Figure IX-1. First, all households with one member involved in agricultural activities for at least one hour in the last 12 months would be included in the sample. Within this pre-selection, households would be sorted into sugarcane households if at least one member was involved in sugarcane-related activities in the last 12 months, and non-sugarcane households if no member was involved in sugarcane-related activities in the last 12 months. Within each household, children could be classified as working in sugarcane, working in non-sugarcane agriculture, working in non-agriculture work or not working.

Figure IX-1. Fully-Inclusive Sampling Design



A sample design focused on capturing all children in non-sugarcane work as a reference group would not require any household screening process, since it would necessarily have to include all households in the geographic areas selected. In this case, the child-level comparison would have shown how children working in sugarcane compare with all other working children and non-working children in sugarcane-producing areas.

A final lesson learned concerns non-response. Future surveys expecting significant non-response at the child level should include specific methods to mitigate the effects of non-response bias. There are several approaches that could be implemented to this end, particularly if non-response is partly due to temporary absence, as in this study.

The first one would be to include time and budget buffers in the project to allow fieldwork teams as many callbacks as necessary to reach all or most children. While this approach would be ideal from a research perspective, it would introduce significant uncertainty in the project budget and schedule.

A second approach would be to collect completely overlapping data from household and child informants, as is the practice in some National Child Labor Surveys. Biases due to child non-response could be adjusted using population parameters from household interviews. This approach is however problematic for two reasons: First, it is expensive and inefficient. Most overlapping data will eventually not be used, representing an unnecessary burden to respondents, interviewers, supervisors, data processing teams and analysts. Second, even if the overlapping data is used, it is uncertain that overlapping data collected from household informants can be used as a reliable population parameter to adjust for child non-response. While basic demographic information about children in the household will probably be reliable, information on

more specific aspects may not. For example, in the current project demographic data collected from household informants was reliable and could be used to adjust for non-response. However data on other aspects, such as the number of injuries suffered by children, was likely under-reported by adult informants and would lead to biased adjustments.

A third approach could be to estimate both the magnitude and direction of non-response error using methods such as response-probability adjustments (Politz & Simmons, 1949). Response-probability adjustments collect data from respondents on their likelihood to be at home for *k* similar periods. Respondents are weighted by the reciprocal of the estimated likelihood to give a greater weight to respondents that are less likely to be at home. This method is more economic than the two previous alternatives, although it does not reduce the problem of reduced sample sizes, and it may also result in large weights with the corresponding increase in variance.

A possible partial adjustment would be to conduct the survey in the evening rather than during the day to capture household members not present during day hours. There are however several issues to consider. On the one hand, working late hours often is likely to hurt morale of the field teams, which may have to spend the night in areas with no lodging. On the other hand, it is not clear whether conducting the survey in the evening would make a difference in the results, as callbacks were done in the evening and teams stayed in the field late when necessary. Callback appointments were scheduled in the evening for children that were absent during the day as well. However, feedback from the interviews indicates that many children who could not be interviewed were either absent for several days or did not want to be interviewed.

X. BIBLIOGRAPHY

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